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ABSTRACT

This report highlights relevant research and expert opinion on girls' involvement in physical activity and sport. Research findings revealed: (1) more girls are participating in a wider array of physical activities than ever before; (2) regular physical activity in adolescence can reduce risk for obesity and hyperlipidemia, increase bone mass and reduce risk of osteoporosis in later life, and reduce stress and depression; (3) exercise and sport participation can enhance mental health by improving feelings about body image, self esteem, and enhancing self confidence; (4) poverty substantially limits many girls' access to physical activity and sports; (5) excessive exercise and certain forms of athletic participation can lead to eating disorders; and (6) barriers to positive experiences for some girls are lack of opportunity, gender stereotypes, and homophobia. Study findings suggest a number of conclusions and practical recommendations, including: girls should be encouraged to get involved in sports at an early age; specific mechanisms which enhance girls' opportunities to be physically active must be developed and supported; physical educators, exercise leaders, and coaches are in a primary position to recognize disordered eating patterns; girls and boys should work and play together from an early age; coaches and physical educators should give girls equal access and attention; and professionals must actively intervene in the face of discrimination. Directions for future research are also outlined. (Contains approximately 300 references.) (ND)

SP

ED 413 320

THE PRESIDENT'S COUNCIL
ON PHYSICAL FITNESS AND SPORTS

REPORT

Physical Activity & Sport in the Lives of Girls

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PHYSICAL & MENTAL HEALTH DIMENSIONS
FROM AN INTERDISCIPLINARY APPROACH

UNDER THE DIRECTION OF

THE CENTER FOR RESEARCH ON GIRLS & WOMEN IN SPORT

UNIVERSITY OF MINNESOTA

SUPPORTED BY

The Center for Mental Health Services / Substance Abuse and Mental Health Services Administration

U.S. Department of Health and Human Services

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May 1997

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THE PRESIDENT'S COUNCIL
ON PHYSICAL FITNESS AND SPORTS

REPORT

Physical Activity & Sport in the Lives of Girls

PHYSICAL & MENTAL HEALTH DIMENSIONS FROM AN INTERDISCIPLINARY APPROACH

UNDER THE DIRECTION OF
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UNIVERSITY OF MINNESOTA

SUPPORTED BY
The Center for Mental Health Services / Substance Abuse and Mental Health Services Administration
U.S. Department of Health and Human Services

Message from Donna E. Shalala
Secretary of Health and Human Services

The year 1996 marked a breakthrough in our understanding of the benefits of physical activity and health for all Americans. With the publication of the first Surgeon General's Report on Physical Activity and Health, we have clearly documented the fact that men and women of all ages can improve the quality of their lives through a lifelong practice of regular moderate physical activity. And the research indicates that physical activity need not be strenuous to achieve real health benefits. A regular, preferably daily routine of at least 30-45 minutes of brisk walking, bicycling, or even dancing will reduce the risks of developing coronary heart disease, hypertension, colon cancer, and diabetes. Moreover, regular physical activity can reduce symptoms of depression and anxiety; help control weight; and help build and maintain healthy bones, muscles and joints.

Childhood and adolescence are critical times to lay the foundation for lifelong physical activity, but, unfortunately, too many young people, especially girls, are not active enough. As children grow into adolescence, their participation in physical activity declines dramatically. As the Surgeon General's report tells us, almost half our young people aged 12 to 21 are not vigorously active on a regular basis and 14 percent are completely inactive. And young females are twice as likely to be inactive as young males.

These are dangerous trends, and we need to change them. Fortunately, this landmark report on Physical Activity & Sport in the Lives of Girls from the President's Council on Physical Fitness and Sports tells us some of the steps we can take to enable girls to reach their full potential. It tells us that we need to provide more quality school-based physical education for girls. It tells us that we need to encourage girls to get involved in sport and physical activity at an early age. It tells us that we need to challenge stereotypes that impede girls' participation in sports. And it tells us that we have made progress in some areas. For example, the Title IX legislation enacted in 1972 has opened the doors for millions of girls to participate in school sports.

Americans took enormous pride in the accomplishments of the 1996 Olympic gold medal female athletes in soccer, softball, swimming, track and field, gymnastics, basketball, and other sports. We need to build on that spirit and develop a national commitment to

ensure that every girl receives the encouragement, training, and support she needs to develop and maintain an active lifestyle. Increasing physical activity among girls is a formidable public health challenge, but the potential rewards are great: a more vigorous nation, better health and greater leadership opportunities for girls, prevention of premature death and unnecessary illness, and a higher quality of life for our citizens. I strongly encourage all Americans to join us in this effort.

Message from the President's Council on Physical Fitness and Sports

In the summer of 1996, our nation cheered the performance and achievements of the U.S. women Olympians and Paralympians. The images of strong, active women were inspiring, a long way from the days when females were relegated to "lady-like" sports and young girls were left on the sidelines as their brothers played.

Following on the heels of the Surgeon General's Report on Physical Activity and Health, this landmark review makes clear that participation in physical activity and sport can help girls weather the storms of adolescence and lay the foundation for a healthier adult life. The report looks at "the complete girl" through an interdisciplinary approach to investigate the impact of physical activity and sport participation.

The conclusions are striking: regular physical activity can reduce girls' risk of many of the chronic diseases of adulthood; female athletes do better academically and have lower school drop-out rates than their nonathletic counterparts; and, regular physical activity can enhance girls' mental health, reducing symptoms of stress and depression and improving self-esteem.

But further vigilance and research are needed to ensure that all girls and boys can experience these same benefits. While Title IX has a tremendous impact on expanding physical activity opportunities for females, its compliance and enforcement have often wavered. Parents, teachers, and coaches should be encouraged to challenge stereotypes about girls' participation in physical activity and sport. There is a lack of information and research about how race, ethnicity, and socioeconomic status might affect girls' sport and fitness involvement.

I greatly appreciate the support of the Members of the President's Council for this endeavor, which stemmed from the Council's Task Force on Girls and Minorities. Their enthusiasm and unflinching support for expanding the reach of the PCPFS into important areas such as this have been critical to the successful completion of this important project.

Council Member Deborah Slaner Larkin deserves special recognition for her vision and commitment to this report and for her many years of leadership in promoting opportunities in physical activity and sports for girls and women.

I would like to thank the Center for Research on Girls & Women in Sport, under the able leadership of Dr. Mary Jo Kane, and the Center for Mental Health Services, our partners in this endeavor.

It is my hope that this report will serve as a catalyst for parents, coaches, educators, researchers, and community leaders to encourage and create opportunities for girls and young women to become—and remain—more physically active throughout their lives.

Sandra Perlmutter
Executive Director

Letter from the Project Directors

Dear reader:

On behalf of the President's Council on Physical Fitness and Sports, we are honored to present this research report. All of us who have been involved with the project have a great respect for the power that sport and physical activity can wield. Such involvement has helped shape our lives. In fact, it is a major reason why many of us have chosen this area as our life's work.

Physical Activity and Sport in the Lives of Girls: Physical and Mental Health Dimensions from an Interdisciplinary Approach was created to highlight the multiplicity of ways in which physical activity and sport have become an integral part of girls' lives. It examines the benefits girls derive from participation in physical activity and sport; the barriers that prevent them from reaching their full potential; and the kinds of environments in which girls learn how to develop and foster the best parts of themselves both on and off the playing fields. The report was also created to develop future research paths and policy recommendations as a guide for planning and programming.

This is a groundbreaking report because it marks the first time an interdisciplinary approach has been used in a government document that examines the impact of sport and physical activity in the lives of girls. We have chosen authors who are experts in the physiological, sociological, psychological and mental health fields to each write a section discussing significant issues in their respective academic areas. The interdisciplinary approach is particularly important because it enables us to talk about the "complete girl"—her social, physical, emotional and cultural environment—rather than just one aspect of a girl's experience. It should be noted that, on occasion within the report, the authors present differing points of view with respect to certain research findings. For example, scientific studies in the mental health field may suggest a particular relationship between self-esteem and physical activity that has not been identified in the area of sport sociology. This should not be interpreted as problematic or contradictory; instead, it can be viewed as an opportunity for further discussion and for reinforcement of the need for future interdisciplinary research. Finally, one strength of this report is a reference list that includes numerous citations from a variety of academic disciplines. Such a list can be an invaluable resource for academics, educators and practitioners.

Related to the issue of interdisciplinarity, you will find when reading the report that different authors use different terminology when talking about girls. As a general rule, however, the word "girl" is used when authors are referring to girls 18 and under. Other terminology is used to further delineate age. For example, "adolescent female" typically refers to girls between the ages of 13-18, while "young girl" generally signifies 11 and under.

While the amount of research covered in this report is thorough and in-depth, because of space limitations, we could not include every aspect of what is known about the many ways in which sport and physical activity influence girls. We also addressed many issues related to diversity such as cultural or racial heritage and different physical abilities. However, what is clear from the authors' findings is that we have a great deal more to learn about the particular ways in which involvement in sport and physical activity affects minority groups of girls. We urge others to use this document as a way to pursue future areas of research; many potential directions are outlined in detail in the authors' research sections.

It is important that the information presented in this document reaches a variety of audiences from parents, teachers and coaches to administrators and policy makers in educational institutions and government agencies. Everyone involved in the lives of our children needs to know what factors contribute to girls' development. Our hope is that those most able to effect change will use this information as a vehicle for pursuing future areas of research and developing and implementing programs that will make a difference in one of this country's most important assets--girls.

Finally, this report is dedicated to all of the parents, physical education teachers, coaches and athletic administrators who recognize the importance of sport and physical activity for all girls. These hard-working individuals spend their days on the ball fields and playgrounds teaching skills and developing a young girl's character. They are on the phone at night organizing the next game, event or season. Their weekends are often spent at meetings and conferences. They fight for Title IX compliance, coverage of a game or a walkathon in the local paper, new uniforms, adequate facilities and safe fields. Without their commitment and dedication to bettering the lives of girls throughout this country, this report would not have been possible. We are all in their debt!

Mary Jo Kane
Project Director

Deborah Slaner Larkin
Project Director

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THE PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS (PCPFS) *serves as a catalyst to promote, encourage and motivate the development of physical activity, fitness and sports participation for all Americans of all ages. Established by Executive Order in 1956, the PCPFS is made up of twenty members appointed by the President. Assisted by elements of the United States Office of Public Health and Science, the PCPFS provides guidance to the President and the Secretary of Health and Human Services on how to get more Americans physically active.*

THE CENTER FOR RESEARCH ON GIRLS & WOMEN IN SPORT (CRGWS) is dedicated to examining how sport and physical activity impact the lives of young girls and women. The first of its kind in the country, the CRGWS is an interdisciplinary research center leading a pioneering effort on significant social and educational issues. The CRGWS is equally committed to teaching and mentoring students and to community outreach and public service.

THE CENTER FOR MENTAL HEALTH SERVICES, Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services, provides national leadership for improving the quality and availability of treatment and prevention services for mental illness, particularly with respect to adults with serious mental illness and children with serious emotional disturbances.

This comprehensive report is funded by the Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services. The Project Directors are grateful to the Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services, for their support in making this study possible. It will enable us to provide information to educators and decision makers who are in a position to make a difference in the lives of girls across the country.

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Appreciation is extended to the following individuals, all of whom have made a significant contribution to the preparation of this report: Leslie Fisher, Ph.D. (University of Virginia); Darlene Kluka (Oklahoma State University); Judy Mahle Lutter, President (Melpomene Institute, St. Paul MN); Gloria Solomon, Ph.D., (Texas Christian University); Diane Wakat, President (Intelligent Nutrition Systems, Charlottesville VA); Art Weltman, Ph.D. (University

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Executive Summary

THE PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS (PCPFS) serves as a catalyst to promote, encourage and motivate the development of physical activity, fitness and sport participation for all Americans. This report expresses the PCPFS's mission to inform the general public of the importance of developing and maintaining physical activity and fitness in our daily lives, and to heighten awareness of the links that exist between regular physical activity and good health. In the past, involvement in sport and physical activity has been primarily associated with males. Over the past two decades, however, girls' and women's involvement in such activity has increased dramatically. This is in large part due to the impact of Title IX, federal legislation passed in 1972 designed to prohibit sex discrimination in educational settings. For example, prior to Title IX, 300,000 young women participated in interscholastic athletics nationwide; today, that figure has leaped to approximately 2.25 million participants. In the wake of this participation explosion, scholars and educators have begun to explore its impact on girls and women.

Physical Activity and Sport in the Lives of Girls: Physical and Mental Health Dimensions from an Interdisciplinary Approach was created in order to highlight relevant research and draw on expert opinion regarding girls' involvement in physical activity and sport. This is the first report that brings together research findings—and practical suggestions for implementing these findings—from three interdisciplinary bodies of knowledge: physiological, psychological and sociological. An additional section explores the relationships among physical activity, sport and the mental health of girls. The primary goal was to identify and discuss the beneficial ways that physical activity and sport influence girls' physical health, psychological well-being and overall social and educational development. An additional goal was to identify the problematic aspects of girls' involvement. These include, but are not limited to, eating disorders, gender stereotyping and institutional barriers such as lack of opportunity and access to various resources. Although this report examines some of the most current and cutting-edge issues, because of space limitations, the authors do not claim to include all relevant research and concerns surrounding girls' involvement with sport and physical activity.

The report focuses on girls and not boys (other than for comparison where appropriate) for several reasons. First, with respect to sport and physical activity, girls have been neglected by researchers in the biomedical sciences, education, physical education and the social sciences. Second, though girls and boys share common experiences, girls also exhibit unique physiological, emotional and social outcomes that merit special

investigation. Next, scholars need to keep pace with the aforementioned explosion and diversification of girls' involvement with sport and physical activity in the wake of Title IX. And finally, researchers increasingly recognize that the social world of physical activity and sport is not a one-dimensional universe, but a highly complex set of institutions populated by two genders with diverse racial and ethnic backgrounds, cultural values, physical abilities and sexual orientations.

Public apathy about physical education, and the glitzy distractions of commercialized sports in mass media, sometimes hide the basic fact that physical activity is a public health resource for millions of American girls as well as their families and communities. In order to advance knowledge regarding the real and potential contributions of physical activity and sport in the lives of millions of girls, several areas for future research are highlighted by the authors at the end of each section. Finally, a set of policy recommendations is also included in order to encourage responsible action on the part of parents, coaches, educators, sport leaders and elected officials. With such a "teamwork" approach, we *can* make a difference in the lives of girls.

KEY RESEARCH FINDINGS

Some of the most important research findings documented and highlighted in this report suggest that:

- More girls are participating in a wider array of physical activities and sports than ever before in American history. (Introduction)
- Regular physical activity in adolescence can reduce girls' risk for obesity and hyperlipidemia (i.e., high levels of fat in the blood) which, in turn, have been known to be associated with lower adult onset of coronary heart disease and certain cancers. Regular physical activity can also help girls build greater peak bone mass, thereby reducing adult risk for osteoporosis. (Research Report, Section I)
- Exercise and sport participation can be used as a therapeutic and preventative intervention for enhancing the physical and mental health of adolescent females. (Research Report, Section IV)
- Exercise and sport participation can enhance mental health by offering adolescent girls positive feelings about body image, improved self-esteem, tangible experiences of competency and success and increased self-confidence. (Research Report, Sections II and IV)
- Research suggests that physical activity is an effective tool for reducing the symptoms of stress and depression among girls. (Research Report, Sections II and IV)
- Sports are an educational asset in girls' lives. Research findings show that many high-school female athletes report higher grades and standardized test scores and lower

dropout rates, and are more likely to go on to college than their nonathletic counterparts. (Research Report, Section III)

- Recognition of physical activity and sport as an effective and money-saving public health asset is growing among researchers and policy makers. (Introduction; Research Report, Sections I, II and IV)
- Poverty substantially limits many girls' access to physical activity and sport, especially girls of color who are overrepresented in lower socioeconomic groups. (Introduction; Research Report, Section III)
- Excessive exercise and certain forms of athletic participation have been found to be associated with a higher prevalence of eating disorders. (Research Report, Sections I, II, III and IV)
- The potential for some girls to derive positive experiences from physical activity and sport is marred by lack of opportunity, gender stereotypes and homophobia. (Research Report, Sections III and IV)

CONCLUSIONS AND RECOMMENDATIONS

A summary of some of the most important conclusions and practical recommendations discussed in this report suggest that:

- Girls should be encouraged to get involved in sport and physical activity at an early age because such involvement reduces the likelihood of developing a number of deleterious health-related conditions. For example, active girls' high caloric expenditure decreases their risk of becoming obese. (Introduction; Research Report, Section I)
- Specific mechanisms which enhance girls' opportunities to be physically active must be developed and supported. Recreational, school-based physical education and sport programs are ideal ways to facilitate both health-related fitness and the acquisition of fundamental motor skills for a lifetime of activity. (Research Report, Section I)
- Involvement in sport and physical activity has tremendous potential to enhance a girl's sense of competence and control. Therefore, leaders should incorporate cooperative as well as competitive opportunities to learn physical skills in a nonthreatening environment. (Research Report, Sections II and III)
- Parents, coaches and teachers must be aware of girls' motives for participating in sport and physical activity. Girls participate not only for competitive reasons, but to get in shape, socialize, improve skills and have fun. All motives, not just those related to highly competitive activity, must be respected and validated. (Research Report, Sections II and III)
- Physical educators, exercise leaders and coaches are in a primary position to recognize disordered eating patterns among girls. These individuals must be knowledgeable about

the physical and psychological signs and be able to make referrals to specialists as necessary. (Research Report, Section II)

- Girls and boys need to work and play together, starting from an early age. It is often easier for both sexes to play together and learn in small, relaxed groups where children know each other well and have the prerequisite skills. (Research Report, Section III)
- Coaches and physical educators should give girls equal access and attention. Girls as well as boys should play the important and interesting positions in a game and receive feedback to help improve their physical skills. (Research Report, Section III)
- Professionals must actively intervene in the face of discrimination. When adults observe inequities or gender stereotyping on the playing field or in the physical education classroom, it is often best to openly confront issues of prejudice such as sexism. (Research Report, Section III)
- Involvement in physical activity, exercise and sport promotes psychological well-being; the therapeutic use of physical activity and exercise for improving the mental health of adolescent girls goes beyond traditional treatment and mental health programs. (Research Report, Section IV)
- Physical activity and exercise have been shown to be a mood enhancer and an anxiety reducer, thereby acting as a natural, cost-effective intervention for the mental health of adolescent girls. (Introduction; Research Report, Sections II and IV)

DIRECTIONS FOR FUTURE RESEARCH

Because of the importance of sport and physical activity in the lives of girls, it is incumbent for us to continue to expand our scientific knowledge base regarding the physiological, psychological, sociological and mental health consequences of participation in these activities. A summary of some of the most important directions and agendas for future research suggests that:

- **Research studies must be conducted** to develop and implement motivational strategies encouraging physical activity during childhood and into adulthood. (Research Report, Section I)
- **Research should establish guidelines** for appropriate training levels. When establishing these guidelines, scholars should consider areas that are particularly critical for girls, such as the prevalence of overuse injuries and issues related to body composition. For example, specific guidelines for appropriate activity levels can prevent injuries due to excessive training and/or early specialization in one sport. Knowledge regarding appropriate levels of training can also minimize an undue focus on body composition (e.g., body image) that can lead to exercise addiction. (Research Report, Sections I and II)

- **Research studies need to be designed** that better distinguish between sport-specific or sport-general dropouts—versus sport transfers—to ascertain if girls are leaving organized sport entirely or simply sampling a variety of sporting activities. These investigations should collect and analyze participation statistics and conduct exit interviews with children who drop out in order to identify negative reasons for cessation and address them in future programs. (Research Report, Section II)
- **We need to increase our research agenda** to be more inclusive. For example, future research must be expanded beyond an analysis of highly competitive sport to include a broader range of activities (e.g., personal fitness) and settings (e.g., physical education classrooms). Additionally, studies should include participants from racially, ethnically, economically and ability-diverse backgrounds because gender interacts with these diversities in complex ways (Gill, 1993). (Research Report, Sections II, III and IV)
- **Research studies must utilize** an interdisciplinary perspective. For example, we need to adopt a biopsychosocial perspective that takes into account physical, psychological and social context variables simultaneously. We also need to develop "research teams" that enhance partnerships between scholars and practitioners. (Research Report, Sections II and IV)
- **Future research should be guided** by the principle that strategies for improving participation rates must also address the *quality* of the sport and physical activity experience for girls. (Research Report, Section III)
- **Scientific studies should identify** which factors influence exercise as treatment interventions. When using exercise as a treatment intervention to restore mental health for adolescent girls, we need to examine the impact of peer (same-sex and cross-sex) influences and individual versus group approaches. (Research Report, Section IV)

Introduction

DON SABO, PH.D., D'YOUVILLE COLLEGE

WHEN THE PRESIDENT'S COUNCIL ON PHYSICAL FITNESS AND SPORTS was established by Executive Order in 1956, few Americans could have imagined the surge of participation in physical activity and sport among girls and women over the last two decades. Millions of girls now participate in a rapidly expanding variety of physical activities, and female athletes perform feats that once were deemed physiologically impossible. Despite the startling speed of these recent changes, however, the explosion of women's participation and ability is more accurately viewed as an acceleration of a centuries-long march toward greater physical freedom and athletic excellence.

During the nineteenth century, health reformers and educators included "female gymnastics," walking, riding and dancing as key components of young women's education (Vertinsky, 1994). In the countryside and towns, archery, tennis, bicycling, ice boating, roller skating, croquet, golf and dance became popular among girls and women. A "new model of able-bodied womanhood" emerged, which challenged traditional notions about female frailty and ladylike behavior (Verbrugge, 1988, p. 196). The integration of exercise and athletic activity into school curricula expanded during the twentieth century. Recreational athletics for girls became popular in the form of "play days" between 1920 and 1950 and competitive varsity sports such as basketball and track and field multiplied after World War II (Hult, 1994). The passage of Title IX in 1972 ushered in an era of coed physical education and greater opportunities for girls to play high school and college sports. The fitness revolution also grabbed the attention and allegiance of millions of girls and women during the 1970s and 1980s.

Physical Activity and Sport in the Lives of Girls: Physical and Mental Health Dimensions from an Interdisciplinary Approach presents an interdisciplinary portrayal of the connections among the physical, psychological, social and cultural aspects of physical activity and sport in girls' lives. When viewed collectively, the research findings discussed here show how physical activity and sport impact the "complete girl": that is, the many interrelated aspects of a girl's life ranging from musculoskeletal and cardiovascular functioning, to psychological well-being, gender identity, relationships with friends and family and performance in school. Physical activity and sport offer girls more than gateways to fun, competition or an elevated heart rate. While the authors of this report are

aware that girls' experiences vary a great deal, the vision of the complete girl fosters a comprehensive awareness that exercise and sport are not just about physical movement but personal development, identity and values as well.

PARTICIPATION, OPPORTUNITY AND BARRIERS

American girls now participate in a wider range of physical activities and sports, and at more levels of competition, than ever before in our history. While Oregon girls learn to square their shoulders to the volleyball net, a group of girls play "four squares" in rural New Hampshire, an Arkansas teenager teaches hopscotch to her little sister, and Native American teenagers meet for lacrosse practice. As girls bounce and chatter through double-dutch jump rope in Bedford-Stuyvesant, in-line skaters glide through a Houston suburb. As an Ohio high school basketball team runs through drills, friends from DeKalb, Illinois, meet for an aerobics class. And women give gutsy performances while winning gold medals at the 1996 Summer Olympic Games in sports ranging from softball, soccer and basketball to gymnastics, track and field and swimming.

Females have become prime movers in the fitness realm. A recent nationwide survey conducted by the National Sporting Goods Association indicated that more women (55.4 million) than men (43.4 million) participate in several leading fitness activities—aerobic exercising, bicycling, exercising with equipment, exercise walking, running and swimming. A more specific breakdown reveals that an estimated 18.3 million women do aerobics, 26.5 million bike for exercise or mountain bike, 23.8 million exercise with weights, 45.2 million walk, 8.65 million run or jog and 32.6 million swim (National Sporting Goods Association, 1995).

Girls' participation in school athletic programs and community-based programs is also mushrooming. Girls now comprise about 37 percent of all high-school athletes, representing an increase from one in 27 girls who participated in 1971 to one in three girls in 1994. The ratio for boys during this timeframe remained constant at one in two. In 1994–1995, 2,240,000 girls participated in high-school sports, compared to 3,554,429 boys, 37 percent and 63 percent respectively (National Federation of State High Schools Associations, 1995–1996). In terms of some specific sports, an estimated eight million girls under age 17 played basketball in 1994 (compared to 12.5 million boys) while 6.7 million girls played soccer. As more girls developed athletic interests and physical skills at the grassroots levels of competition during the 1970s and 1980s, participation in college and Olympic sports also exploded. Women now comprise 33 percent of all college athletes and approximately 39 percent of United States Olympic team members. Reciprocally, as more female role models become available for young girls to emulate, their interest and involvement in fitness and athletic activities will continue to grow.

Despite these gains, it is important to realize that women's historical trek toward greater physical and athletic opportunity has been filled with barriers. In the past, various individuals have condemned exercise and sport as unladylike and eminent physicians warned women against overstrain and sterility. One of the authors of this report, sport sociologist Margaret Carlisle Duncan, points out that stereotypes associated with traditional notions of femininity and masculinity exalted boys' strength and athletic feats while equating girls' athletic talents with "tomboyism." Parents, coaches and teachers often encouraged boys to test their physical and emotional limits while ignoring or coddling girls.

Today, girls' achievements in physical activity and sport remain overshadowed by the cultural prominence of men's sports. In school and community-based programs, boys still receive a disproportionate share of opportunities to participate in exercise and sport. Male-dominated sports organizations remain mired in policies and beliefs that shortchange girls and women, and parents or advocates of girls are forced to wage expensive legal battles in the pursuit of gender equity. Indeed, it is unlikely that the large increase in girls' athletic participation and growing cultural acceptance of physically active and athletic females would have occurred without the passage of Title IX (Birrell & Cole, 1994; Cahn, 1994a; Messner & Sabo, 1990). Pressured by the perceived threat of lawsuits or payment of legal fees, and pulled by increasing demands for greater opportunity for girls, Parent Teacher Associations and school administrators began to rethink traditional clichés like "girls just aren't as physical as boys" or "sports are more important for boys than for girls."

And finally, harsh economic conditions, prejudice and institutional barriers have limited the participation of many poor girls, girls of color and girls with disabilities. Ironically, where the real and potential health outcomes of physical activity and sport are probably most needed, participation rates and access to resources are most lacking. As the authors of this report repeatedly document, girls' increasing participation and interest in physical activity and sport bode well for their health. Yet these positive national trends are being undermined by the growing numbers of adolescents who are becoming sedentary and obese, the substantial numbers of girls who are dropping out of sports, and the persistence of social and economic barriers that limit girls' opportunities to develop physically active lifestyles.

Harsh economic conditions, prejudice and institutional barriers have limited the participation of many poor girls, girls of color and girls with disabilities.

UNDERSTANDING THE COMPLETE GIRL

Physical activity and sport are not simply things young girls do *in addition to* the rest of their lives, but rather, they comprise an interdependent set of physiological, psychological and social processes that can influence, and, in varying degrees, sustain girls' growth and development. The interdisciplinary approach that underpins this report is designed to make

more visible some of the connections among physical activity, sport and the rest of girls' lives. Some examples of the broader linkages that are examined in the body of this report are highlighted below.

Psychological Well-Being

Within the traditional framework of psychoanalytic theory, nonconformity to traditional gender expectations was considered pathological. Hence, women's interest and involvement in business, science, sport or other "masculine" activities were clinically suspect. In contrast, the review of psychological research presented in this report shows that physical activity and sport are apt to strengthen rather than worsen the psychological health of girls. The authors document a combination of psychosocial benefits such as self-confidence, self-esteem, higher energy levels and positive body image. It is important to note that these gains appear to be influenced by interactions with parents, who can either encourage or dampen a daughter's interest and involvement. So, too, do persistent and narrow cultural prescriptions for appropriately "feminine" behavior erode the potential of physical activity and sport to enhance girls' mental health. On the other end of the interdisciplinary spectrum, some of the biological and chemical processes associated with health and fitness concerns are also highlighted. And finally, two of the authors of this report, psychology of sport scholars Doreen Greenberg and Carole Oglesby, discuss the growing recognition among mental health professionals that exercise and sport can be effective treatment interventions for the significant number of girls who suffer from depression or anxiety disorders.

Obesity

The Surgeon General's report on nutrition and health (Public Health Service, 1988) identified obesity as a major public health problem in the United States; subsequently, the Surgeon General's report on physical activity and health (United States Department of Health and Human Services, 1996) identified physical inactivity as a serious public health problem nationwide. Aware of this concern, the authors of this report discuss a variety of factors associated with the rising rate of obesity among American adolescents. Social factors include the influence of television, dwindling requirements for physical education in the schools, and the steep sport dropout rate among adolescents. Related to physical health concerns, this report explores the physiological and epidemiological aspects of obesity such as the links between the development of hyperlipidemia, hypercholesterolemia, hypertension and diabetes, which in turn elevate risk for coronary heart disease. Finally, in her section on the psychological dimensions of participation, psychology of sport scholar Diane Wiese-Bjornstal stresses the need to help overweight or

obese girls overcome social pressures and personal misgivings about physical activity so that they can become less sedentary.

The Female Athlete Triad

Several authors discuss the complex combination of psychological and physiological processes that operate in relation to the female athlete triad. In Section I, exercise physiologist Patty Freedson and psychology of sport scholar Linda Bunker document many physiological benefits of exercise and sport participation for girls such as potential gains in strength and aerobic power. It also appears promising that girls' involvement in sport and exercise could effect increased immune functioning and the prevention of certain cancers in adult life. They also express their concerns about the "female athlete triad," which refers to three interrelated health problems that are prevalent among some types of female athletes and some girls who engage in excessive exercise: eating disorders, exercise-induced amenorrhea and bone loss. Several authors demonstrate how these syndromes have complex psychological, physiological and social origins and profiles. For example, girls' perceptions of their bodies are partly shaped by unrealistic media images that create false connections between a lean body type or "washboard abs" and subsequent success, sex appeal and self-mastery. The obsession with thinness can also be fed by a coach who demands weight loss from the athlete, or the desire to be attractive to boys and accepted by one's peers. Because we are in the early stages of investigating this syndrome, the data we have are very limited. Female athletes most at risk should certainly be aware of the dangers, but we should not assume that the triad is limited to an athletic population (Lutter & Jaffee, 1996).

On average, female athletes fare better academically than their nonathletic counterparts.

Sport and Academic Achievement

It is said that "the fish are the last ones to discover the ocean." In Section III, Margaret Carlisle Duncan illustrates how several research findings debunk the "dumb jock" stereotype that high school athletes perform poorly in the classroom. School administrators are often unaware of the positive interplay between high-school athletics and academic achievement as measured by grade point average, standardized achievement test scores, lowered risk for dropout and greater likelihood to attend college. On average, female athletes fare better academically than female nonathletes, though Caucasian and Hispanic female athletes are more apt to derive some direct educational gains than are their African-American counterparts ("Women's Sports Foundation Report: Minorities in Sport," 1989). Good physical and mental health are also correlates of academic performance and social adjustment. Hence, from an interdisciplinary perspective, it is likely that athletic participation is part of a mutually reinforcing array of physical, psychological and social processes that enhance the overall educational experiences and commitments of many girls.

In summary, understanding the role of physical activity and sport in the life of the "complete girl" is a dauntingly complex agenda. The mosaic of interdisciplinary findings and interpretations assembled in this report will deepen both insight and resolve in this regard.

POVERTY, RACE AND PHYSICAL ABILITY

Girls from economically disadvantaged backgrounds, girls of color and girls with disabilities can face unique obstacles in relation to physical activity and sport. Poor families cannot afford to invest in health club memberships, exercise machines and equipment for their daughters. Families of color, who are disproportionately poor, often cannot pay user fees or transportation costs to bring daughters back and forth between home and school. Fitness and sport are often seen as unattainable luxuries rather than potential resources. Dual-worker parents or single parents (most often mothers) sometimes depend on older daughters to cook or care for smaller children after school, thus curbing their involvement with extracurricular activities. Poor or working-class girls often work part-time jobs to help families make ends meet, thereby reducing the amount of time and energy available for exercise or sports. Parental perceptions of the benefits of exercise and athletic participation for daughters also vary by race and class. For example, one national survey found that Caucasian parents more often mentioned health-related benefits, character benefits and social factors than did African-American parents ("The Wilson Report: Moms, Dads, Daughters and Sports," 1988).

Little is known about the dreams, interests and physical activities of girls of color.

Many of the problems girls of color experience in relation to physical activity and sport grow out of the same soil—poverty. Epidemiological research shows that exposure to violence, family fragmentation, substance abuse, sexually transmitted diseases and greater risk for unwanted sexual activity often share the common causality of poverty. Lack of physical activity and athletic opportunity can be added to this list. Economically disadvantaged girls of color are more likely to suffer from an unsafe and unhealthy environment. The simple act of walking or jogging may be problematic in neighborhoods where crime flourishes. Poor girls often do not have access to athletic resources, effective coaching and expert training. There is a lack of basic information about exercise, diet and sport. They are less apt to receive quality physical education and athletic training at earlier ages which, in turn, erodes the foundation for subsequent motor development. Because school and community athletic programs depend on tax dollars to thrive, capital flight from many urban areas is undermining the provision of adequate exercise and athletic opportunities for both minority girls and boys. The rising cost of liability insurance is also making it difficult for school districts, especially poorer ones, to provide quality athletic and intramural programs.

Little is known about the dreams, interests and physical activities of girls of color. Although women of color are often more visible in sport media, and in certain sports like basketball and track and field, they are underrepresented in sports such as swimming and tennis (Abney & Richey, 1992). During the early 1980s, African-American and Hispanic adolescent females comprised about 4.4 percent and 3.2 percent of high school athletes respectively, compared to 29.1 percent of their Caucasian counterparts (Melnick, Sabo, & Vanfossen, 1992). There is also indirect evidence that African-American and other ethnic minority females are less physically active than Caucasian females (King et al., 1992; Pate et al., 1995).

And finally, despite the accomplishments of the Special Olympics and Paralympics, few opportunities exist for emotionally or physically challenged adolescents to engage in exercise and sport. Differently-abled children are three times more likely to be sedentary than their able-bodied peers and the physical activity levels of children with disabilities drop precipitously during adolescence (Longmuir & Bar-Or, 1994). It should be noted that the authors of this report make only periodic references to socioeconomic status, race, ethnicity and physical disability. This is due not so much to choice, however, as to the fact that so little research has focused on these groups of girls.

WHAT RESEARCHERS DON'T KNOW CAN HURT GIRLS

This report is the first to assemble the bulk of existing research on girls' involvement with physical activity and sport. However, because of the lack of available data and analysis, the authors of this report were unable to address in any depth some key aspects of girls' experiences with physical activity and sport. Three emerging research concerns are briefly discussed below.

Unwanted Sexual Behavior and Adolescent Pregnancy

Adolescent pregnancy is a major social problem in the United States. Though the belief that sports can help many young girls avoid unwanted sexual behavior and pregnancy is widespread among coaches and athletes, precious little research has been done in this area (Sabo & Melnick, 1996). Two recent studies shed some initial empirical light on the hypothesized connections among exercise, athletics and adolescent girls' sexual behavior. First, Brown, Ellis, Guerrina, Paxton and Poleno (1996) analyzed female adolescents' responses to the United States Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention (1995) survey, "Health Risk Behavior for the Nation's Youth." The researchers found that the more days adolescent females exercised per week, the more likely they were to postpone their first experience with sexual intercourse. Second, preliminary analysis from a study of adolescents from western New

York (an area with one of the highest rates of adolescent pregnancy in the United States) indicated that higher rates of athletic participation among adolescent females were significantly associated with lower rates of both sexual activity and pregnancy (Sabo, Farrell, Melnick, & Barnes, 1996).

Sexual Harassment

Sexual harassment is experienced by approximately 31 percent of female high school students (American Association of University Women Educational Foundation [AAUW], 1993). Sport scholars have recently begun to study the prevalence and social-psychological dynamics of sexual harassment in athletic settings (Sabo & Oglesby, 1995). Many key questions need to be addressed. For example, how do female athletes perceive and react to sexual harassment from boys and adults? Do higher self-esteem and physical prowess fostered by sports help females to be more assertive with inappropriately invasive males than their non-athletic counterparts? Additional research needs to be done on the ways that athletic participation may empower girls to more effectively cope with sexually hostile situations.

In what ways can parents effectively encourage their daughters' involvement with physical activity and sport?

Exercise and Sport as a Family Asset

Regretfully, little research has focused on the ways that exercise and sport promote interaction and insight between parents and children. As is the case with sexual harassment, many important questions in this area remain unanswered. Do parents look to sport to provide after-school activities that keep daughters physically active, socially engaged and off the streets? To what extent do physical activity and sport help parents nurture moral development and values in their children? In what ways can parents effectively encourage their daughters' involvement with physical activity and sport? Clearly, more investigation of the interdependencies among physical activity, sport, families and schools is needed.

CONCLUSION: EXPANDING THE RESOURCE

This report will fuel the growing awareness that physical activity and sport are enormously important in the lives of girls. Perhaps this message is being sent by girls themselves who are, as the saying goes, "voting with their feet," and entering the realms of fitness and sport in vastly increasing numbers. In contrast to the nineteenth century naysayers who decried strenuous exercise and athletic participation for women as dangerous and unladylike, today, educators and public health advocates recognize the overall benefits for girls' physical health and emotional well-being. As health care costs continue to escalate, and pressures on the American health care system to provide quality

care intensify, the logic of preventive health strategies that involve physical activity and sport becomes economically salient.

The overall vision that emerges from this report frames physical activity as a developmental aid and public health asset for girls and, by inference, for boys as well. Physical activity can serve as a social and cultural intersection where adolescents, parents and caring adults can come together in mutually supportive ways. The aerobics class, fitness run or basketball court are safety zones where young girls can hang out together, test and challenge themselves, learn about competition, develop physical fitness components such as cardiovascular endurance, strength and flexibility, and have fun all at the same time.

The real and potential benefits that physical activity and sport have to offer girls, their families and communities, however, continue to be stymied by several factors. Economic and cultural barriers block wider participation, especially for poor girls and girls of color. Despite increasing interest and participation rates, physical activity and sport remain underutilized resources for the many girls who are mired by sedentary lifestyles or dissuaded from getting involved because of gender stereotypes, discriminatory practices and lack of opportunity. There are also appreciable numbers of girls for whom athletic participation is associated with illness, injury and addiction to exercise rather than with physical and mental well-being. And finally, there needs to be more systematic research on the numerous ways that physical activity and sport influence girls' lives. Simply put, too little research has been done in an area where girls have too much to gain. For this reason, each of the authors has listed priorities for future research at the end of their respective sections.

This report concludes with a list of policy recommendations. The information and analyses gathered here hold implications for parents, educators, coaches, athletic administrators, public health officials and lawmakers. There is more at stake in the struggle to expand girls' physical abilities and athletic opportunities than learning to do jumping jacks or winning and losing games. Future policy decisions need to be grounded in the broader understanding that girls' involvement with physical activity and sport is just as much about physical vitality, emotional well-being, community health and educational opportunity as it is about who runs the farthest or scores the most points.

SECTION I:

Physiological Dimensions

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MUCH IS KNOWN FROM RESEARCH ON THE EFFECTS OF EXERCISE and sport participation on adolescents and adults. However, the majority of this research was conducted on males, or focused on comparisons between boys and girls, with little research focusing exclusively on females. The present review must therefore include research on adults and males, as well as the biophysical effects of physical activity and sport on girls and the potential impact of these experiences on their maturation and adult lives.

The acquisition of fundamental motor proficiency, which is directly linked to physical activity, is an important goal for early childhood. Not only must children learn to control their bodies in space, they also need to acquire the fundamental skills which will aid daily living, vocational pursuits and recreational/leisure activities. These skills are interdependent with health-related physical fitness and must be considered in any discussion of the biophysical effects of physical activity on girls.

The acquisition of fundamental motor proficiency, which is directly linked to physical activity, is an important goal for early childhood.

It is important that activities in childhood include both the motor and health aspects of physical fitness. Both health-related fitness and motor skill development are important because: (a) children need a reasonable level of motor skill proficiency to participate in activities that build endurance, power and strength, and (b) they need reasonable levels of fitness to engage in exercise and sport activities which will provide them with physical activity as adults. Recognizing the need for both motor skill development and adequate fitness is critical because the benefit of lifetime participation in physical activity has an impact on psychological aspects (see also Section II: Psychological Dimensions), social aspects (see also Section III: Sociological Dimensions) and the mental health of young girls and women (see also Section IV: Mental Health Dimensions).

The simultaneous acquisition of both motor and physical fitness begins in early childhood, as children use movement as their mechanism to learn about their world. It continues in school where all children should participate in daily physical education activities which set both the pattern of physical activity and the fundamental skills to be successful and happy when participating.

Physical activity has long been recognized for its effects on the maturing child.

However, one of the challenges of interpreting research on children is the difficulty of differentiating between the changes in physiological functioning which may be affected by regular exercise or strenuous training, and those effects which are the natural result of maturation. This problem is compounded by the traditional use of control groups to help differentiate between the effects of the exercise intervention and those of normal growth and development, because most children are already quite active (Bar-Or, 1989). This makes the experimental designs more complicated, the exercise interventions more intensive than those which would be adequate for adult participants, and the interpretation of the data more challenging for the researcher.

The biophysical changes which result from exercise and training may shift in the same direction as those which occur due to maturation, or they may change in the opposite direction. For example, peak anaerobic power *increases* due to both maturation and physical training. Similarly, *decreases* in oxygen cost of moving are also caused by both maturation and physical training. With respect to biophysical changes in the opposite direction, the body's ability to use oxygen (i.e., anaerobic threshold, percent $\dot{V}O_2$ max) *decreases* due to maturation but *increases* as a result of training (Bar-Or & Malina, 1995).

It is possible to consider the known effects of physical activity in many different ways. The following information clusters the research into three categories related to biophysical considerations: benefits for girls, potential deleterious effects and potential long-term effects related to disease prevention and quality of life.

BENEFITS OF PHYSICAL ACTIVITY FOR GIRLS

Research on the biophysical impact of exercise on children and adolescents is quite extensive although, as previously mentioned, investigations focusing exclusively on girls is limited. The following information addresses those benefits specifically relevant to girls. We focus in particular on benefits related to power (i.e., aerobic power or endurance and anaerobic power), strength, weight management and health-related issues such as immune function effects and reproductive maturation.

Strength

Muscular strength is defined as the ability to generate force and includes dynamic or isotonic strength (i.e., the ability to generate force through a range of motion) and isometric strength (i.e., the ability to generate force at a single point in the range of motion where muscle length does not change). With respect to the maturing female, girls grow stronger as they mature, making it difficult to assess whether changes are the result of maturation or physical activity levels. However, several studies have found that short-term training

programs can produce increases in muscle strength in children (Grodjinovsky & Bar-Or, 1984; Sale, 1989). Pfeiffer and Francis (1986) have suggested that the relative gain in strength due to exercise is similar for all children, whether they be prepubescent, pubescent or postpubescent. According to Malina and Beunen (1996), "prepubescent" is defined as the absence of development of secondary sex characteristics, "pubescent" is initial and continued development of secondary sex characteristics, and "postpubescent" is adult or mature state of development for secondary sex characteristics. Increases in physical activity and short-term training programs can produce positive changes in several forms of "strength-related" factors, including anaerobic power and muscle endurance.

Maturation-related strength increases at a linear rate for most girls up until about age 14. Beyond that point, the rate of increase slows and for sedentary girls may actually decrease (Blimkie, 1989; Parker, Round, Sacco, & Jones, 1990). However, systematic physical activity can produce marked improvement in strength for girls, probably due to the improvement in motor unit activation and coordination (Sewall & Micheli, 1986; Wilmore, 1974).

Power

The concept of power is related to the capacity to do work per unit time and is directly related to both muscular strength and cardiovascular functioning. The following discussion of power includes both aerobic power which is necessary for endurance activities and anaerobic power which is necessary for short-term, high-energy– demanding activities.

Aerobic Power and Endurance Performance

Cardiorespiratory fitness represents the maximal transport of oxygen, which is a function of the product of heart-rate and stroke volume (i.e., cardiac output), the oxygen-carrying capacity of the blood (i.e., hemoglobin content) and the maximal arterio-venous oxygen difference. Aerobic power is typically measured by VO_2 max as determined by either cycle ergometry or treadmill exercise. Expressed as an absolute measure ($l \cdot min^{-1}$) or as relative to body mass ($ml \cdot kg^{-1} \cdot min^{-1}$), measurements of aerobic power are extremely reliable in both children and adults if standard criteria defining maximal responses are used and if subjects—children and adults—participate with maximum effort.

The general pattern of change in absolute aerobic power ($l \cdot min^{-1}$) for girls suggests that it increases with growth prior to adolescence, but in the absence of systematic exercise, it steadily declines into adulthood. Summarizing cross-sectional data from several studies testing children of different ages, Armstrong and Weisman (1994) reported a decrease in absolute aerobic power in adolescent girls 13 to 15 years of age.

Despite the apparent decrease in absolute aerobic power in females ages 13 to 15,

the overall rate of increase in treadmill absolute aerobic power for females between the ages of eight and 16 was approximately $12l \bullet yr^{-1}$. Examination of treadmill-relative aerobic power across age revealed a steady decline for females (Armstrong & Weisman, 1994). Aerobic power relative to body mass (i.e., $\dot{V}O_2$ max expressed as $ml \bullet kg^{-1} \bullet min^{-1}$) averaged $50ml \bullet kg^{-1} \bullet min^{-1}$ for girls at eight years of age which decreased to approximately $40ml \bullet kg^{-1} \bullet min^{-1}$ by age 16. This trend was not observed for males across the same age span; they maintained a relatively stable aerobic power of approximately $55ml \bullet kg^{-1} \bullet min^{-1}$ (Armstrong & Weisman, 1994).

This decrease in aerobic power is most apparent at the time of puberty when there is an increase in body fat. Additionally, cross-sectional data indicate that inactive children have lower $\dot{V}O_2$ max than normally or highly active children (Malina & Bouchard, 1991). Fortunately, this decline in aerobic power can be reversed with aerobic training (Rowland, 1989). Both short-term and long-term training programs seem to result in about the same improvements in maximal aerobic power among sedentary older children and adults (Bar-Or & Malina, 1995; Pate & Ward, 1990).

Aerobic power and endurance performance are closely related in adults, but seem to be dissociated in adolescents. Specific to adolescent females, aerobic power expressed relative to body mass declines through normal growth and development, yet endurance performance (e.g., timed mile run) improves. For example, time to complete a one-mile run improves by approximately 15 percent in females between eight and 17 years of age, despite a 20 percent decrease in relative aerobic power (Rowland, 1989). Nonetheless, it should be pointed out that regular exercise can increase oxygen uptake and diminish some of the decline that would otherwise occur. Improvements in running economy that occur with maturation most likely explain the dissociation between aerobic power and endurance performance in adolescence.

Anaerobic Power

Anaerobic power, or the capacity to perform strenuous activities in short bursts of time, does not rely as extensively on the cardiovascular system. For most girls, anaerobic power (such as that required to do a vertical jump) increases throughout early childhood, but decreases in adolescence and young adulthood. However, anaerobic power improves in children who exercise, especially those who train systematically. Gains as a result of training for adolescents (10 to 13 years) range up to about 20 percent.

Weight Management

Juvenile obesity is "arguably the most prevalent chronic illness among children in North America and represents an immense public health challenge" (Bar-Or & Malina, 1995,

p. 110). A child is considered obese when his or her weight-height ratio is 20 percent or more above the upper limit of the desirable weight as assessed by primary care physicians and pediatricians using standard growth charts (Insel & Roth, 1991).

According to data from the National Center for Health Statistics (1991), approximately twice as many children are overweight today compared to children in the 1960s (Blair et al., 1996). It should be noted that juvenile obesity is particularly prevalent in girls from highly urbanized areas (Dietz & Gortmaker, 1984), some ethnic groups (e.g., Hispanic Americans, Pima Indians [King & Tribble, 1990]) and those with disabilities (Dietz, 1995).

Problems with weight control occur when the caloric intake does not match the caloric expenditure. Though the major problem for obese individuals may be the nature of the calories consumed (especially excess fat intake in terms of the percent of the total calories), exercise is an important adjunct in weight control for high-school girls (Wells, 1991; Moody, Wilmore, Girandola, & Royce, 1972) and for women 18 and over (Miller, Lindeman, Wallace, & Niederpruem, 1990). Exercise has the effect of increasing caloric expenditure, and also seems to protect fat-free mass while promoting the loss of fat mass (King & Tribble, 1990).

Participation in regular exercise or sport may reduce the likelihood of childhood obesity.

For the general population of girls, their daily routine provides an adequate balance of physical activity and caloric intake. However, to assist the obese child, it is essential that a multidisciplinary program include nutrition education and increased physical activity both during weight loss and afterward. Many of these programs are provided in physical education programs within our schools and, as Ward and Bar-Or (1986) have suggested, this is the most practical way to combat this national problem.

Vogel (1986) presented an extensive review of physical education programs and concluded that daily programs can produce changes in body composition (i.e., percent lean versus fat mass), aerobic fitness, balance, endurance performance and lipoprotein profiles (especially for children with elevated lipoproteins). In addition, when programs are designed to promote motor skills and aerobic fitness, changes in skinfold thickness may occur (Simons-Morton, Parcel, & O'Hara, 1988). The key to controlling obesity is a combination of caloric reduction and increasing caloric expenditure. However, when controlling obesity, one must keep in mind the concurrent need to support the growth process and to maintain nutritional adequacy.

Immune System

The relationship between immune function and physical activity must be discussed in relation to the intensity of the activity (Liesen & Uhlenbruck, 1992). A great deal of research reports that low- to moderate-intensity training enhances immune function with

increases in levels of interleukin-1 and interferon and increased numbers of natural killer cells, circulating lymphocytes, granulocytes, monocytes and phagocytic macrophages (Kramer & Wells, 1996). However, with exhaustive or very intense and prolonged training, there may be a depression of immunological function. Overtraining may depress the levels of immunoglobulin in blood and saliva, reduce the responsiveness of T-lymphocytes to antibody synthesis and increase the risk of infectious and viral diseases (Newsholme & Parry-Billings, 1994).

The T-lymphocytes and natural killer cells seem to function as a tumor inhibitor to retard the growth of cells which have been genetically damaged (i.e., cancer). Similarly, monocyte and macrophage function also decreases the likelihood that aberrant cells will be facilitated or that metastases will occur. Thus it appears that moderate intensity exercise may have a positive effect in retarding diseases such as cancer or those caused by viruses such as colds or influenza (Newsholme & Parry-Billings, 1994). See the section below entitled "Potential Long-Term Effects" for a more detailed discussion of this topic.

Research on the effects of exercise on the immune system is mixed, depending on both age and intensity of physical activity. There is some evidence that increased physical activity produces moderate immune response suppression, but the clinical importance of this response is debatable (Calabrese, 1990). For example, adolescent athletes have been found to be more susceptible to infections than nonathletes (Shephard, 1984), but this may also be true for other children who participate in group activities in close proximity to one another (e.g., band, drama). In contrast, in a prospective study, Osterback and Ovarnberg (1987) found no difference in immune function between 12 year-old athletes and nonathletes.

Reproductive Functioning: Menarche

There are many anecdotal reports of the positive influence of regular physical activity on the menstrual cycles of pubescent girls. Many girls report less physical distress associated with the cycle and increased periodicity (i.e., regularity) when moderate physical activity is part of their lifestyle.

For many years it was believed that delayed onset of the menstrual cycle (i.e., menarche) was the *result* of sports participation by young female athletes. This conclusion was based on the observation that menarche occurred later in athletes than nonathletes. An alternative explanation was offered by Malina (1983) who suggested that young females who mature early are socialized away from sports participation. For the young female athlete, late maturation accompanied by delayed fat deposition favors athletic success and may result in a type of self-selection. In other words, delayed

menarche may *result* in continued participation in competitive sport (Stager, Wigglesworth, & Hatler, 1990). Wells (1991) summarized data from several studies and reported the age of menarche for girls participating at different competitive levels: nonathletes = 12.29 years, athletes = 13.02 years, college athletes = 13.05 years, national-level track and field athletes = 13.58 years, Olympic athletes (Montreal) = 13.66 years, national-level middle-distance runners = 14.10 years, Olympic volleyball athletes = 14.18 years and national-level runners = 14.20 years. It should be noted that these data were collected retrospectively and may be influenced by recall bias in which athletes remember later menarche.

Delayed menarche is a particularly complex issue which could have both positive and negative consequences. Historically, delayed menarche, which is often found in female athletes who train at high levels, was viewed as a problem because it supposedly compromised fertility (Frisch, Wyshak, & Vincent, 1980). More recently, concern about delayed menarche has focused on its impact on peak bone density. Menarche is associated with an increase in circulating levels of estrogen. Estrogen is a necessary hormonal trigger for increasing bone density in adolescence and maintaining bone density in the mature female. Studies have reported that early menarche is associated with increased bone density (Fehily, Coles, Evans, & Elwood, 1992; Johnell & Nilsson, 1984). Research examining the relationship between delayed menarche in athletic females and bone density is lacking. Nevertheless, it is possible that delayed menarche and/or amenorrhea with their associated reduced circulating estrogen may result in reduced peak bone mass and increased risk of osteoporosis in later life because the available time for laying down bone is reduced (Wells, 1991). This concern seems to be greatest for females who train at very high levels and who may experience both delayed menarche and amenorrhea.

On the other hand, delayed menarche may be of some positive significance because the early onset of menarche has been linked with increased risk for breast cancer (Doll & Peto, 1981). Participation in regular exercise or sport may also reduce the likelihood of childhood obesity, which often produces earlier onset of menarche. See sections below entitled "Amenorrhea" and "Cancer."

POTENTIAL DELETERIOUS EFFECTS OF PHYSICAL ACTIVITY ON GIRLS

In general, moderate to strenuous physical activity poses few risks to the healthy girl and, when deleterious effects do occur, they seem to involve the musculoskeletal system. Benefits to cardiovascular functioning seem to be unanimously supported, with no known evidence to suggest detrimental effects (Nudel et al., 1989). There is, however,

growing evidence to suggest that we should be concerned for girls who are training at the *elite* level, primarily because of overuse injuries and changes in reproductive system maturation and functioning. Three of these concerns—osteoporosis, amenorrhea and disordered eating—have sometimes been lumped together and described as the "Female Athlete Triad." The foundation for these problems is that there is often a preoccupation with body weight and composition among female athletes. This may lead to undereating and overexercise and underconsumption of calories which together produce undesirable health-related consequences. It should be noted that this is not a problem unique to girls, but one which is also found in boys who participate in such activities as gymnastics, ice skating and wrestling (Hui, 1995).

Injuries

Increased levels of physical activity and sport participation are bound to produce increases in injuries. Many of these injuries are caused by inappropriate grouping of children based solely on age, without respect to maturation, weight or skill level. When children are grouped by chronological age, the smaller, less mature individual may be forced to compete against a more mature individual who is larger, stronger and faster. Similarly, increased participation in competitive sport for children may necessitate making a distinction between injuries caused by physical contact or purposeful intent (e.g., sliding into second base to break up a double play), versus those that occur as routine injuries (e.g., a sprained ankle). Differences in maturation and in the child's purpose of participation—as well as intensity/seriousness of training and competition—may present the potential for decreased performance and physical harm. All of these factors may discourage children from participating.

Injuries may also be caused by inappropriate levels of strength and flexibility needed for particular activities. Through appropriate educational programs generally provided in school physical education, children and coaches/teachers should learn appropriate techniques for proper warm-up, stretching and physical conditioning.

Amenorrhea

Some young women experience irregular or interrupted menstrual cycles which have been associated with excessive exercise. It is not clear whether this is a benefit (in relation to reduced estrogen-dependent cancers due to fewer ovulatory cycles) or a liability (in relation to such outcomes as lower bone density).

The etiology of amenorrhea (i.e., interrupted menstrual cycle) may not simply be a high level of energy expended in exercise, but may also be related to energy imbalance,

which is a function of both energy intake and energy expenditure (Loucks & Heath, 1994; Wakat, Sweeney, & Rogol, 1982). This concept is supported by studies that have shown normal reproductive function even with increased exercise energy expenditure when caloric intake was not limited (Rogol et al., 1992).

Strenuous physical training may produce ovulatory dysfunction and shortened luteal phases of the menstrual cycle, perhaps combined with a prolonged follicular phase (Loucks, Vaitukaitis, & Cameron, 1992). One explanation for this is the activity of the hypothalamic-pituitary-adrenocortical axis which may depress the hypothalamic GnRH pulse generator (Kramer & Wells, 1996).

A potential negative consequence of excessive physical activity accompanied by persistent reduced estrogen levels may be lower bone density, often linked to amenorrhea and osteoporosis. Female athletes who are amenorrheic or oligomenorrheic (i.e., irregular cycles) have been found to have lower bone densities than the general population (Drinkwater et al., 1984; Myburgh, Bachrach, Lewis, Kent, & Marcus, 1993; Rencken, Drinkwater, & Chesnut, 1993).

Disordered Eating

The pressures to maintain the so-called "ideal physique" may produce dysfunctional eating habits.

Much has been written about the problems of disordered eating in elite female athletes or those who train at extreme levels. The pressures to maintain the so-called "ideal physique" may produce dysfunctional eating habits and result in body fat levels which drop too low (Steen, 1991; Wilmore, 1974). The negative health consequences of anorexia and bulimia (i.e., bingeing on food then purging) are great and deserve attention, but it is important to realize that this is not a problem which is "caused" by exercise, but rather by psychological issues in the life of girls (see also Section II: Psychological Dimensions, on the psychological effects of exercise on girls). Female athletes who participate in sports where body weight and appearance are considered to be essential components for optimal performance (e.g., distance runners, figure skaters, gymnasts and dancers) are particularly vulnerable to this problem (Montgomery, 1991).

A survey by Rosen and Hough (1988) indicated that one hundred percent of gymnasts studied were on a diet, 62 percent were using a method of weight control that was extreme, and 75 percent were told by their coaches that they had to lose weight. Similar observations have been reported in ballet dancers (Braisted, Mellin, Gong, & Irwin, 1985). Although data are lacking, it seems reasonable to conclude that adolescent female athletes involved in sports where weight and body fat are predictors of successful performance, have an increased risk for developing disordered eating patterns.

In addition, it should be noted that the presence of disordered eating is not only seen in elite-level athletes but also among young girls who strive to be elite-level performers. Young athletes who are not particularly successful in sport may also be susceptible to this problem as they see dietary practices as something they can control and use to please their coach or parent despite the fact that high level performance is not possible.

POTENTIAL LONG-TERM EFFECTS OF PHYSICAL ACTIVITY

Children grow into adulthood with the body they have lived with and nurtured or abused while growing up. Much of the early support for physical activity for children focused on the advantages of adequate strength and flexibility in the prevention of low-back pain and the importance of regular physical activity to prevent obesity. However, in recent years, the focus has expanded to include the positive effects of physical activity on chronic diseases, some of which often begin in childhood and adolescence and may later manifest in adulthood (e.g., cancer, diabetes, osteoporosis, heart disease) (Despres, Bouchard, & Malina, 1990).

Moderate to high levels of physical activity, and the consequent increase in health-related fitness, are important for children for at least three reasons: (a) they may lead to a habit of physical activity which may carry over to adulthood; (b) they may contribute to overall health status in later life; and (c) they may have a preventive function in some adult diseases. As Bar-Or and Malina (1995) have suggested, there are at least two reasons for encouraging active lifestyles in girls:

- Regular physical activity during childhood and youth may prevent or impede the development of several adult conditions in which physical inactivity is only one part of a complex, multifactorial etiology (e.g., obesity, degenerative diseases of the heart and blood vessels and musculoskeletal disorders, specifically osteoporosis and low-back syndrome).
- Habits of engaging in regular physical activity developed during childhood and adolescence may persist into adulthood and thereby reduce the later incidence of such conditions. (p. 107)

There is growing evidence about the link between several prominent adult degenerative diseases and the lack of adequate physical activity and improper diet. This seems to suggest that there are potentially positive effects from physical activity in childhood and the consequent likelihood of developing a lifestyle and attitude that may encourage continued activity as adults. In particular, the apparent link between physical activity and coronary heart disease, diabetes, obesity and osteoporosis seems to suggest a preventive function for physical activity, exercise and sport participation.

Coronary Heart Disease

It was noted in the recent Surgeon General's Report on Physical Activity and Health (U.S. Department of Health and Human Services, 1996) that, in the United States, coronary heart disease has a higher mortality rate than all types of cancer combined. The disease is thought to begin in childhood and results in atherosclerotic plaques lining the arteries of the heart and reducing blood flow and oxygen delivery to the heart. The primary pathology associated with coronary heart disease (CHD) is atherosclerosis, which is linked to elevated blood cholesterol levels and hypertension. There appears to be a direct link between CHD and elevated levels of total cholesterol, low-density lipoprotein cholesterol (LDL), very-low-density lipoprotein cholesterol (VLDL) and low levels of high-density lipoprotein cholesterol (HDL) (National Cholesterol Education Program [NCEP], 1991).

Children who have higher than average levels of body fat reportedly have a greater risk for elevated blood pressure, total cholesterol and LDL cholesterol (Williams et al., 1992). The link here is dramatic, because children who have high levels of cholesterol are almost three times more likely than other children to have high cholesterol levels as adults (NCEP, 1991).

The apparent link between physical activity and coronary heart disease, diabetes, obesity and osteoporosis seems to suggest a preventative function for exercise and sport participation.

In a major review article examining relationships among physical activity, nutrition and chronic disease, Blair et al. (1996) found that the best strategies for lowering cholesterol levels appear to be a combination of diet and exercise. These authors also discovered that exercise may be beneficial because it lowered blood pressure, perhaps through decreased cardiac output and decreased peripheral resistance, and exercise may also reduce the risk of thrombosis because of positive effects on blood clotting. It is important to note that this major review examined studies which sampled males and females across the lifespan.

Cancer

The link between cancer and exercise is probably intimately related to diet and body composition. Obesity is associated with an increased risk for endometrial and gall-bladder cancers in women and the magnitude of excess weight is also related to breast cancer in postmenopausal women (Kimm & Kwiterovich, 1995). Though little evidence exists that the physical activity of girls directly affects such cancers, it is likely that establishing a habit of regular exercise may continue into adulthood and aid in the maintenance of appropriate weight.

Few studies have been done that are prospective or that begin with younger women. One exception is a case-control study by Bernstein, Ross and Henderson (1992). These authors reported that with respect to cancer, a strong link exists between exercise and menstrual cycles. The authors also state that for every year that menarche is delayed,

breast cancer is reduced five to 15 percent. Finally, these authors found that women who start menstruating at an early age, and establish regular cycles quickly, have a higher risk of cancer than those with later menarche or irregular cycles. This is a particularly salient finding because later onset of menarche and/or irregular cycles are typical of girls who participate in high levels of training associated with interscholastic or intercollegiate athletics.

One promising development is that estrogen-dependent cancers (breast, endometrial and ovarian) may be less prevalent in women who exercise regularly, especially those for whom exercise is part of their occupation. Kramer and Wells (1996) have postulated four mechanisms which might account for the preventive effects of exercise on these cancers:

- Maintenance of low body fat and moderation of extraglandular estrogen
- Reduction in number of ovulatory cycles and subsequent diminution of lifetime exposure to endogenous estrogen
- Enhancement of natural immune function
- The association of other healthy lifestyle habits (p. 322)

Questions remain regarding the link between physical inactivity and increased incidence of estrogen-dependent cancers; further research is thus needed in this area. One of the difficulties in interpreting these data is the confounding variable of body mass. It is not absolutely clear if the beneficial effects result from the physical activity itself, or are the result of less body fat because of an active lifestyle. High body fat and obesity are related to low levels of sex-hormone binding globulin (SHBG), which is the primary carrier for estradiol, an active form of endogenous estrogen. These low levels of SHBG may facilitate more free estradiol which may stimulate tumor growth (Bernstein & Ross, 1993). Further research is needed in this important area of investigation.

Another link to physical activity and reduced cancer may be the effect of serious training on menarche. Research has suggested that the risk of breast cancer is reduced up to 15 percent for each later year of age at menarche (Hsieh, Trichopoulos, Katsouyanni, & Yuasa, 1990). Women whose natural menopause occurs before age 35 have been found to have a decreased incidence of breast cancer, while those with natural menopause after age 55 have an increased incidence. This may suggest an association between the cumulative number of ovulatory menstrual cycles and estrogen-dependent breast cancer (Kampert, Whitemore, & Paffenbarger, 1988). If this is true, an increase in physical activity during adolescence may be an ideal nonhormonal approach to decrease the number of lifetime ovulatory cycles and reduce exposure to estrogen (Bernstein et al., 1992).

Diabetes Mellitus

Diabetes mellitus is one of the ten most prevalent causes of death in the United States (Blair et al., 1996). Many of the debilitating effects of diabetes are associated with the increased risk of heart disease and hypertension. Developing the habit of exercise as a child may help to maintain activity levels into adulthood.

Noninsulin dependent diabetes (NIDDM), "known as the insulin-resistance/hyperinsulinemia syndrome" (Blair et al., 1996, p. 336), often occurs with other problems such as hypertension, hyperlipidemia and atherosclerosis. Regular exercise is important in both the prevention and management of NIDDM by increasing glucose transporter concentration and disposal and by increasing insulin sensitivity and lowering plasma insulin concentrations (Horton, 1986). Women who participate in vigorous exercise at least once per week have shown a reduced risk of NIDDM (Manson et al., 1991), while children (both obese and lean) have better glucose control in response to regular exercise (Zierath & Wallberg-Henriksson, 1992).

Osteoporosis and General Bone Health

The decrease in bone mass that accompanies the aging process and the loss of estrogen levels after menopause often results in osteoporosis. The risk factors associated with osteoporosis include age, race, height-to-weight ratio and menopause in women. The three most important factors that contribute to healthy bones appear to be hormonal, nutritional and mechanical (Blair et al., 1996). Because there is no cure for this condition once it occurs, efforts must focus on prevention.

For bones to grow properly, it is important for children, particularly adolescents, to participate in daily physical activity.

In young childhood and adolescence, the development of peak bone mass is directly affected by regular physical activity combined with adequate calcium and vitamin D intake. Greater bone mass develops due to weight bearing, which is most often experienced during physical activity, and helps to protect against osteoporosis later in life when bone loss occurs. In fact, it is essential to place demands on bone for it to remain healthy. For example, a young adult at bed-rest for one week will lose about one percent of spinal density, which could take up to four months to regain (Krolner & Toft, 1983). In contrast, it has been found that young tennis players have higher bone density in their preferred (racket holding arm) than in their other arm, thus supporting the positive role of placing demands on bone (Jacobson, Beaver, Grubb, Taft, & Talmage, 1984).

In order for bones to grow properly, it is important for children, particularly adolescents, to participate in regular (preferably daily) physical activity (Kimm & Kwiterovich, 1995). The growth and development of children should also be monitored in terms of optimal weight and the balance of strength and flexibility. Because weight is linked to spinal bone density, it is critical to monitor underweight children carefully. In particular, any adolescent female who is very lean, has an eating disorder or has

amenorrhea should be considered at high risk for osteoporosis (Ponder et al., 1990).

The interrelationships among such chronic diseases as diabetes, coronary heart disease and stroke argue for a greater need to maintain appropriate weight levels based on one's age, body size and structure. At the same time, caution should be used in overtraining as bone-mineral density may be compromised, especially when linked to amenorrhea.

CONCLUSIONS AND RECOMMENDATIONS

Physical activity, which includes the opportunity to develop an active lifestyle, to be physically fit and to acquire fundamental motor skills, can positively impact the overall health of girls in several ways. For example, increased fitness levels can contribute to better posture, the reduction of back pain and the development of adequate strength and flexibility, qualities which allow girls to participate fully in their daily activities, both vocational and recreational. The information presented below represents a summary of the contributions of sport and physical activity to the health and fitness of girls, as well as some recommendations for ensuring that all girls benefit from such involvement.

- Girls' participation in physical activity and sport positively impacts their aerobic power by increasing $\dot{V}O_2$ max stroke volume, O_2 uptake and ventilatory capacity. Additionally, girls can accrue strength gains through increased muscle activation, improve flexibility due to increased range of motion and perhaps enhance immune functioning (Rowland, 1990).
- Girls' early involvement in physical activity and sport can reduce the likelihood of developing a number of deleterious health-related conditions. For example, being physically fit positively influences blood lipid profiles which in turn minimize the development of atherosclerosis. In addition, the increased caloric expenditure of active girls decreases their risk of becoming obese (Rowland, 1990).
- There is a growing public health consensus (McGinnis, 1992) that "diet and physical exercise patterns have a synergistic effect in reducing mortality" (Blair et al., 1996, p. 341). However, professionals must remain cognizant of the potential health concerns associated with high levels of physical activity and overtraining, as well as some sport participation, namely, athletic injuries and the development of amenorrhea, which may be linked to osteoporosis in post-menopausal women. We must establish and maintain health- and fitness-related programs to reduce the occurrence of such deleterious conditions.
- Given that the biophysical benefits of exercise for girls dramatically outweigh the disadvantages, mechanisms providing opportunities for enhanced physical activity must be developed and supported. Independently organized clubs and sports, recreational programs and school-based physical education and sport programs are ideal ways to

facilitate both health-related fitness and the acquisition of fundamental motor skills for a lifetime of activity.

- The United States Department of Health and Human Services document, "Healthy People 2000: National Health Promotion and Disease Prevention Objectives" (1991), recommends that the daily physical education rate for school-aged children should reach 50 percent by the year 2000. In all probability, this recommendation will not be attained because even once-per-week participation rates barely meet this standard. There has been a statistically significant decline in overall daily physical education attendance in grades nine to 12 from 41.6 percent to 25.4 percent from 1991 to 1995 (U.S. Department of Health and Human Services, 1996). Many sources, including the National Children and Youth Fitness Study I (NCYFS I) (Ross & Gilbert, 1985) and NCYFS II (Ross & Pate, 1987), have identified the availability of daily physical education programs as the key to improved health and fitness for our children.

DIRECTIONS FOR FUTURE RESEARCH

A great deal of information is available about the effects of physical activity on the biophysical characteristics of girls. However, numerous issues remain unresolved.

- **Determine optimal levels of physical activity.** The daily life of active girls seems to be adequate for growth and maturation. However, for girls in school, or for those who have difficulty with weight maintenance, enhanced levels of activity have beneficial effects on health, while relative inactivity has deleterious effects. It has been recommended by the United States Department of Health and Human Services (1991) that all children participate in daily physical education. This seems like the appropriate delivery mechanism to ensure that all children, without respect to gender, ethnicity or socioeconomic status, have access to this foundation for healthy adulthood.

  Research should establish guidelines for appropriate levels of training so that parents and coaches can capitalize on appropriate activity levels and sport experiences. When establishing such guidelines, scholars should consider areas that are particularly critical for girls—the prevalence of overuse injuries and issues related to body composition (i.e., the relative amounts of fat and lean mass). Specific guidelines for appropriate levels of activity can prevent, for example, injuries due to excessive training and/or early specialization in one sport. Additionally, appropriate levels of training and activity can minimize an undue focus on body composition (e.g., body image) that can contribute to eating disorders or excessive exercising for the purpose of weight control.
- **Develop and implement motivational strategies encouraging physical activity during childhood and into adulthood.** Girls who begin exercise and sport

programs outside of school often drop out due to competing desires and time pressures. This trend may extend into adulthood where currently less than 25 percent of adults exercise regularly and may drop out of even the most well-meaning exercise programs (Blair et al., 1996). Research studies must be conducted to develop and empirically support strategies which emphasize the importance of regular physical activity and to motivate young girls and adults to participate.

- **Identify the role of physical activity in health-related problems for girls.** A significant childhood health problem is obesity. The combination of increased physical activity and decreased caloric intake is the most effective technique for weight control. In addition, the management of several childhood diseases is enhanced by regular exercise, but physical activity and exercise may be more difficult due to other life changes that often accompany these conditions (e.g., diabetes and cerebral palsy). There is need for increased research focusing on the diverse ways in which physical activity can be used in the management of a variety of health problems of children and teenagers.
- **Determine the links between early childhood behaviors and risk factors for serious disease in adults.** It appears that many of the chronic diseases of adulthood have their "biological and ecological roots in childhood" (Kimm & Kwiterovich, 1995, p. 269). Research is needed to identify prudent preventive strategies which can be encouraged for all children, particularly those at risk for chronic diseases.
- **Delineate the factors that impact the association between exercise and reproductive functioning.** The delay in menarche, which sometimes accompanies strenuous exercise and training, may have both positive and negative consequences. More research is needed on the relationship between the type and level of exercise, and various factors related to reproductive functioning such as the onset of menarche, risk of estrogen-linked cancers, bone density and osteoporosis, and amenorrhea.

SECTION II:

Psychological Dimensions

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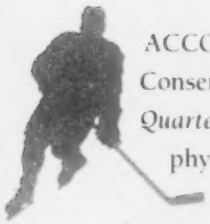

ACCORDING TO A RECENT STATEMENT issued by the International Scientific Consensus Conference on Physical Activity, Health and Well-Being (*Research Quarterly for Exercise and Sport*, 1993), physical activity positively influences physical *and* psychosocial health at all stages of the life cycle; thus, the promotion of physical activity is an effective means of "improving health and enhancing function and quality of life" (p. v). As young girls and women have increased their involvement in physical activity and competitive sport, there have indeed been corresponding psychological benefits. Some of these benefits include enhanced motivation, increased self-esteem and improved mood states. Although participation in physical activity is an overwhelmingly positive experience for the vast majority of girls, some negative factors associated with participation in physical activity may include increased stress and anxiety, greater tolerance for aggression and the use of pathogenic (i.e., potentially injurious) weight control methods such as self-induced vomiting and the use of laxatives, diet pills and/or diuretics. Psychological benefits are integrally linked with the physical and social dimensions of female sport involvement and must be interpreted in light of these disciplines as well (Weiss & Glenn, 1992).

The promotion of physical activity is an effective means of "improving health and enhancing function and quality of life."

The existing research on the psychological dimensions of girls' physical activity participation is quite limited (Dewar & Horn, 1992; Gill, 1993), and there is even less on those girls from diverse racial and ethnic backgrounds (Duda & Allison, 1990) or with disabilities (Steadward & Wheeler, 1996). However, this is not to suggest that nothing is known about the psychological impact of sport and physical activity in the lives of females. What is known is based upon major themes that have emerged in the research literature of sport psychology: motivation, self-perceptions, moral development, emotional well-being, stress and anxiety, body image and disordered eating. Each of these major themes or areas of investigation is highlighted below. The concluding section presents specific directions for much needed research as well as practical suggestions for those working with young girls in physical activity contexts.

MOTIVATION

It is clear from the vast body of information on why youths play organized sport that girls and boys are more alike in this respect than they are different. Children and adolescents often have multiple motives for participation in organized sport, with "having fun" rated as the most important motive for both boys and girls. Other primary reasons that children play organized sports typically include improving skills, being with friends, becoming physically fit, liking the challenges and experiencing success (Weiss & Petlichkoff, 1989). A recent diverse, nationwide survey of ten thousand boys and girls ages ten to 18 found that when asked about their reasons for playing their best school sport, girls rated "to have fun" first, followed by "to stay in shape," "to get exercise" and "to improve skills" as their next most important reasons (Ewing & Seefeldt, 1989). "The Wilson Report: Moms, Dads, Daughters and Sports" (1988) also found that girls who participate in sports most often report fun as their major motive, with physical, health and social factors frequently mentioned. The majority of motives cited, and certainly the most important motives, are intrinsic or internally-based, rather than extrinsic or externally-based. Only limited research is available on motives for exercise, as opposed to competitive sport involvement, in youngsters (Rowland, 1990), though one study of junior high-school students revealed that girls exercised primarily because they wanted to look better whereas boys wanted to have fun (Godin & Shephard, 1986).

Those children who leave organized sport, either temporarily or permanently, also tend to have multiple reasons for sport withdrawal. Though these reasons are primarily centered on conflicts of interest and wanting to do other things, children also cite injury, lack of fun and skills not improving as reasons for withdrawal (Weiss & Petlichkoff, 1989). Petlichkoff (1996) placed sport withdrawal on a continuum, because many children who drop out of one sport often move on to try another sport or activity and are really "sport transfers" rather than sport dropouts. Children and adolescents who withdraw from sport entirely tend to have lower perceptions of their sport ability than those who remain involved. The important role of having confidence in one's physical abilities will be examined in the self-perceptions section.

Examining motivation on a more theoretical level, Gill (1992) defined the construct of sport orientation noting three distinct dimensions: competitiveness, win orientation and goal orientation. Competitiveness is an achievement orientation focused on entering and striving for success in competitive sport. Win orientation represents a desire to win and avoid losing in competitive sport, while a goal orientation places an emphasis on achieving personal goals in competitive sport. There are consistent gender differences in sport orientation; notably, females typically score higher on goal orientation, while males typically score higher on competitiveness and win orientation.

Research by Garcia (1994) provides an example of how this affects the learning of physical activities. This field study of a culturally, racially and socioeconomically diverse sample of preschool children found that girls were cooperative, sharing and caring when learning fundamental motor skills; competitiveness seemed to inhibit their ability to learn efficiently. Girls cooperated with and supported their friends who were practicing motor skills, while boys adopted a competitive, egocentric practice style. Interestingly, Asian girls and boys both adopted the cooperative learning style, reinforcing the notion of socially constructed and culturally developed gender differences in behavior patterns. Activities allowing for social interaction and cooperative learning can enhance girls' learning of motor skills. Gill (1992) has suggested that "competition and a focus on winning may act as extrinsic motivating forces to decrease intrinsic motivation and that the undermining of intrinsic motivation is especially likely for females" (p. 149).

Related to the overall motivation of youth in physical activity settings are their attributions or perceived causes for success and failure in achievement areas such as sport. These attributions are important because they affect emotions as well as future expectations and motivated behavior. Competitive athletes typically make more internal than external attributions for both success and failure in sport; however, some interesting ethnic and gender differences have emerged. For example, in their survey of the attributional literature in competitive sport, Morgan, Griffin and Heyward (1996) noted that when explaining why they are successful in sport, Caucasian females, Hispanic athletes and Navajo athletes emphasize the controllable aspect of effort while African-American and Caucasian males emphasize their ability. Related to failure in sport, Caucasian females, Navajo athletes and Hispanic athletes tend to emphasize low ability, whereas Caucasian males attribute the cause of failure to low effort. Morgan et al. (1996) reported the results of their own study of the role of ethnicity, gender and experience in attributions for success and failure among male and female high-school track and field athletes (ages 13 to 18). Success in sport was deemed more internal, controllable and stable than failure for both girls and boys across all levels of experience. However, Caucasian children perceived success in sport as more internal and controllable than either African-American or Native-American children. Outside of the competitive sport context, attributions are also important in understanding the motivated behavior of children in broad based physical activity programs. One study looked at eight to 13 year-old boys and girls attending an educational summer sports program. Findings showed that children higher in self-esteem made attributions for their physical competence that were more internal, stable and personally controllable than did low self-esteem children (Weiss, McAuley, Ebbeck, & Wiese, 1990). This key finding documented that children in physical activity settings tend to make attributions consistent with the way they view

their abilities, supporting the importance of enhancing self-perceptions as a means of encouraging motivation for physical activity participation. Parents, teachers and coaches who provide encouragement and feedback to girls practicing physical skills should focus on combining contingent feedback and praise with skill-relevant information on how to improve in future attempts in order to enhance the self-perceptions and motivated behavior of girls (Horn, 1987).

In sum, it appears that girls typically have multiple motives for participation in physical activity and that for optimum enjoyment of the physical activity experience, varied opportunity to meet these motives should be provided. The motivational orientation of girls, however, may be somewhat different from boys in physical activity settings and consideration needs to be given to developing programs to meet their needs. Motivational dimensions of girls' participation are integrally linked with self-perceptions, which is the topic of the next section.

SELF-PERCEPTIONS

The following section summarizes the available information on several slightly different yet related constructs: self-esteem, self-concept, self-confidence, perceptions of competence and self-efficacy. One leading expert in sport psychology has suggested that all of the self-perception constructs essentially refer to the "description of, evaluation of and affect toward one's competencies" (Weiss, 1993, p. 41). Regardless of the label used, these are all important for understanding the psychological dimensions of young girls' participation in physical activity because self-perceptions are predictive of both positive emotions and actual behavior in achievement settings such as sport (Weiss, 1993).

Among secondary physical education instructors, 59 percent said that self-esteem (or self-regard related to "Who am I" and "How do I regard myself") was a primary benefit of physical fitness (Chrysler Fund—Amateur Athletic Union, 1989). McAuley (1994) also reported that self-esteem development was one of several positive psychosocial outcomes related to exercise and physical activity participation. He noted that 69 percent of the studies reviewed supported a positive relationship between physical activity and psychological well-being. Another examination of multiple studies on this topic found a positive association between physical activity and self-esteem in children (Gruber, 1986). Gruber noted that emotionally disturbed, mentally handicapped, perceptually handicapped and economically disadvantaged children showed greater gains in self-concept as a result of physical activity than other children. Three recent studies by the Melpomene Institute examined the relationship between self-esteem and physical activity in female children (Jaffee & Manzer, 1992) and adolescents (Jaffee & Ricker, 1993; Jaffee & Wu, 1996) from diverse geographic, economic and racial

backgrounds. The findings were remarkably similar across both age groups (ages nine to 12 and 12 to 17, respectively). The primary reason girls engaged in physical activity was to have fun, followed by positive health benefits. All three studies found a strong positive relationship between physical activity and self-esteem. Girls who felt most confident about themselves and their abilities were more likely to participate in physical activities at higher levels than girls who felt less confident. Younger girls derived positive self-esteem through challenge, achievement in sports, risk-taking experiences and skill development, while older girls cited these sources of self-esteem as well as gaining esteem from the approval of others and through a belief that girls are capable of playing sports well.

Exercise programs, particularly weight and strength training, can enhance the self-concepts of adolescent female participants as well (Gill, 1993). For example, Brown and Harrison (1986) found that participation in a 12-week program of weight training significantly enhanced self-concept in both younger and older girls and women. Another study examined the use of competitive and cooperative physical fitness programs with high-school girls (Marsh & Peart, 1988). Both the competitive and cooperative programs resulted in enhanced physical fitness; however, the cooperative program enhanced physical ability self-concept and physical appearance self-concept, while the competitive program lowered them. The competitiveness of physical education programs was one of the more negative aspects of the experience for girls. Reinforcing this finding was a study of young girls (Jaffee & Manzer, 1992) in which several reported not liking the competitive nature of fitness testing in their physical education classes. When asked to complete physical education task challenges, these girls preferred working with small groups as opposed to engaging in individualistic, competitive activities.

Moving from more global measures of self-esteem and self-concept as associated with physical activity participation, researchers have also examined more specific aspects of self-confidence in physical activity abilities. There is, however, some debate as to the interaction of physical activity and confidence. For example, a recent synthesis of multiple studies by Lirgg (1991) examined the magnitude of gender differences in self-confidence in physical activity and found that gender differences were fairly small, with boys having greater confidence. One explanation for this finding was the perceived gender appropriateness of physical activity tasks. As summarized by Gill (1992), "when tasks are perceived as appropriate for females, when females and males have similar experiences and capabilities and when clear evaluation criteria and feedback are present, females and males display similar levels of confidence" (p. 150). Further examination of the perceived "appropriateness" of physical tasks is necessary to help clarify these relationships (see also Section III: Sociological Dimensions). It is also important to note

the possibility that girls' assessments of their abilities are more accurate than boys', who may tend to overestimate their actual abilities.

Research by Eccles and Harold (1991) has evaluated the way gender role stereotypes affect sport confidence, even at an early age. In a survey of 875 elementary school children (third to sixth grades), even though girls scored only two percent lower than boys on a battery of motor skills tests, girls self-rated their skills as 14 percent lower than boys. Apparently even by the first grade, girls assess their general athletic ability more negatively than do boys in spite of their objective equality in skill. Both boys and girls felt it more important for boys than girls to have ability in sport. The more girls saw sport as appropriate for girls, the higher their estimates were of their own ability in sports. To the extent that children thought their parents valued sport competence they rated their own sport competence higher.

Other research has also documented the critical role of parents and other significant individuals such as coaches and peers in developing girls' physical self-perceptions. For example, in terms of the role of significant others in encouraging physical activity, one interesting difference between younger (Jaffee & Manzer, 1992) and older (Jaffee & Ricker, 1993) girls noted in the Melpomene studies was that younger girls cited parents as a more important source of encouragement and information than did older girls, who cited peers as more influential. Weiss and Ebbeck (1996) have documented this tendency for children of different ages to use different information sources as a basis for physical competence judgments. Children under the age of ten rely more on adult comments, from ages ten to 14 rely more on peer comparison and evaluation and from ages 16 to 18 rely more on self-referenced information. There do not appear to be gender differences in these dominant sources of information in early childhood. In adolescence, however, females place greater emphasis on the use of self-comparison and comments from adults than males, who rely on competitive outcomes and ease of learning skills as their basis for personal judgments of physical competence (Weiss & Ebbeck, 1996).

Apparently even by the first grade, girls assess their general athletic ability more negatively than boys do in spite of their objective equality in skill.

Given that girls rely on adult comments, it is important to realize that parents in particular play an important role in the affective responses of children to physical activity participation (Brustad, 1996). Children are more likely to enjoy their sport experience if they perceive that their parents have realistic expectations, provide support and encouragement for their efforts and respond infrequently with negative evaluations of their performance. Unfortunately, girls perceive themselves to have lower competence in sport, assign less importance to sport and perceive less parental encouragement for participation than do boys (Brustad, 1993a). Attitudes toward physical activity were somewhat different among parents of girls from various cultural groups in the

Melpomene studies (Jaffee & Ricker, 1993). A focus group of Hmong girls, for example, said their parents held differential attitudes about physical activity for boys and girls. Parents deemed participation in physical activity as "childish" for older girls in the Hmong culture, but acceptable for older boys. "The Wilson Report: Moms, Dads, Daughters and Sports" (1988) identified race and gender differences in parental attitudes toward physical activity for their children as well. In their survey of more than one thousand parents, African-American parents were significantly more likely than Caucasian parents to say that sports were more important for boys than girls. Peer groups are also important influences on self-perceptions, as highlighted by Weiss and Duncan (1992). In a study of eight to 13-year-old males and females enrolled in an educational summer sport program, children higher in both actual and perceived physical competence had better levels of acceptance among their peers.

To summarize, self-perceptions are strongly connected to motivated behavior in physical activity settings. It appears to be a cyclic relationship, in that better perceptions of oneself and one's abilities lead to enhanced effort, persistence and achievement, which in turn further benefit self-perceptions. The role of significant others is critical in positively affecting this cycle. Parents, coaches, and peers should be realistic, supportive and encouraging in reinforcing girls' capabilities in physical activity.

MORAL DEVELOPMENT

Participation in sport and physical activity certainly has the potential to act in a positive fashion, affecting moral development through such processes as observing positive role models in coaches, parents and other children (Martens, 1993) and having the opportunity to engage in prosocial, or ethical, behavior. However, adult leaders must explicitly encourage this development. For example, in a field study of students in a fifth-grade physical education class, systematically structured activities elicited more mature moral reasoning strategies than did traditional teaching approaches (Romance, Weiss, & Bockoven, 1986). These structured moral development activities emphasized the students' rights and responsibilities in the gymnasium and consisted of incorporating moral dilemmas and resolution strategies into basketball, gymnastics and physical fitness instruction units. A recent investigation involving more than four hundred female and male physical education class students in fourth, fifth and sixth grades similarly noted that the implementation of a specially designed moral education program resulted in positive changes in several facets of moral development (Gibbons, Ebbeck, & Weiss, 1995).

Although sport is often proclaimed a character-building activity, organized children's sports programs may develop negative character instead. When children

observe other children and adults cheating, engaging in aggressive behavior and successfully using intimidation to achieve desired goals (Martens, 1993), it may undermine the positive moral development which can occur. A number of scholars have provided empirical support for such claims. For example, Bredemeier and Shields (1993) examined the relationship between moral reasoning (i.e., the decision process that determines the rightness or wrongness of a course of action) and tolerance for aggressive actions. A study of children ages nine to 13 (Bredemeier, 1994) found that those more mature in moral reasoning described themselves as more assertive and less aggressive in response to conflict situations than children with less mature moral reasoning. Among girls and boys in grades four to seven, girls' participation in medium contact sports (i.e., basketball and soccer, the highest level of contact sport reported for girls) was associated with less mature moral reasoning and greater tendency to aggress (Bredemeier, Weiss, Shields, & Cooper, 1986). In a study examining the relationship between motivational orientation and moral behavior among ten to 14-year old female soccer players (Stephens & Bredemeier, 1996), those players who were more ego-oriented (similar to the "win" orientation described earlier) were more tempted to violate moral norms (e.g., lying to an official, hurting an opponent or breaking one of the rules).

"Game reasoning" is one explanation that has been offered to describe the less mature moral reasoning and increased tolerance for aggression common in sport; the unique, egocentric context of competitive sport encourages "legitimized regression" to less mature moral reasoning (Bredemeier & Shields, 1996). For example, among the soccer players described above (Stephens & Bredemeier, 1996), greater temptation to play unfairly was associated with greater approval of behaviors designed to obtain an unfair advantage over an opponent and the belief that many of their teammates would play unfairly in the same situation. This "game reasoning" view represents a double standard and is problematic both in terms of the messages it conveys to young athletes and in terms of the increased risk of injury and harm.

Other research in sport has supported more general findings that females accept and express less aggression than males (Bredemeier & Shields, 1993). In a study of male and female high school basketball players and nonathletes, no moral reasoning differences between athletes and nonathletes were observed. However, high-school females reasoned at a more mature level than males in response to both sport and life dilemmas (Bredemeier & Shields, 1986).

The key to establishing positive relationships between physical activity participation and moral development seems to be in the provision of quality, adult leadership that places high priority on the development of prosocial or ethical behavior in sport and physical activity settings. As Gibbons et al. (1995) concluded, "enhancing

moral growth is not an automatic consequence of participation in physical activity" (p. 253). To attain these positive benefits, deliberate and systematic focus on moral development is essential.

EMOTIONAL WELL-BEING

Physical fitness is positively associated with mental health and well-being. Exercise has beneficial emotional effects across all ages, in both sexes and among those differing in health status (Biddle, 1995; Morgan, 1994). It is apparent from the existing research that adults and youth alike consider mental health an important benefit of physical activity participation. "The Wilson Report: Moms, Dads, Daughters and Sports" (1988) surveyed parents of girls ages seven to 18 and found that 41 percent of the parents believed that promoting mental health was an important benefit of sport involvement for their daughters (see also Section IV: Mental Health Dimensions).

An examination of the exercise and mental health literature specifically related to young females and subgroups of young females (e.g., those with physical disabilities) reveals a paucity of research (Willis & Campbell, 1992). However, the few studies that have been conducted in this area yield promising results. Two experimental programs involving minority adolescent youth combined physical activity with stress management and other health education strategies and found that these components resulted in positive physical and psychosocial outcomes (Fardy et al., 1995; Fardy, 1988). A cross-sectional study of 220 adolescent females investigated the relationship between physical activity and physical and emotional distress accompanying periods of high stress. Participants classified as low exercisers experienced significantly more stress and ill effects than high exercisers or those who adhered to a regimen of vigorous physical activity (Brown & Lawton, 1986).

As illustrated by the above findings, physically active individuals typically have lower levels of depression (Morgan, 1994) and anxiety (Landers & Petruzzello, 1994) than sedentary individuals. Given this relationship, there is a growing interest among health care professionals in the role played by physical activity in preventing the onset of emotional problems and in serving as a treatment adjunct once such problems have developed (Landers & Petruzzello, 1994). For example, in the treatment of anxiety disorders, many physicians routinely prescribe exercise as part of a patient's therapy (Ryan, 1983). One study of youth (ages six to 13) found that incorporating running into a treatment program for emotional and behavioral disorders improved their emotional states (Shipman, 1984). In a recent review paper, Biddle (1995) documented that exercise is associated with small to moderate reductions in anxiety. When comparing anxiety scores before and after engaging in an exercise program, participants tend to

report lower anxiety scores after an aerobic exercise training program. It is not clear, however, that exercise produces larger anxiety reductions than other interventions such as meditation, resting or reading (Weinberg & Gould, 1995). It does seem that individuals who are initially in poor physical condition or are highly anxious achieve the greatest reductions in anxiety from an exercise training program. In dealing with depression, various modes of exercise have been shown to have a moderate effect in reducing depression (Biddle, 1995). It has been demonstrated, for example, that among individuals who are moderately depressed at the time of exercise program initiation, the adoption of aerobic exercise is associated with decreased depression. (See also Section IV: Mental Health Dimensions.)

Conversely, it is also essential to consider the possible negative consequences of exercise involvement as studies have linked some negative outcomes to excessive exercise. According to Johnsgard (1989), "exercise is not inherently dangerous or abusive," but it is not without its risks (p. 269). Several studies have shown that mood states can worsen with increased training volumes (Morgan, 1994). For example, healthy, nondepressed individuals may become depressed as a result of high training loads (i.e., overtraining). Exercise that becomes an addiction or compulsion may also lead to adverse psychological effects. Sachs and Pargman (1984) refer to excessive chronic exercise as an addiction which can "control the person's life" (p. 249). Addictive exercise—excessive chronic exercise—may lead to such problems as decreased ability to concentrate, social problems, fatigue, judgment difficulties, anxiety and depression (Sachs & Pargman, 1984; Shisslak & Crago, 1992; Singer, 1992). It must be emphasized, however, that moderate exercise has never been shown to cause these types of psychological harm (Martinsen & Stephens, 1994).

Competitive sport is an important achievement area for children because physical competence is publicly demonstrated and socially evaluated.

In general, it appears that participation in physical activity can have a mental health buffering effect before the onset of problems, and a beneficial treatment effect in alleviating existing negative emotional states. Participation in excessive levels of exercise, however, can have deleterious effects on emotional well-being. Involvement in highly competitive youth sport can also result in negative effects, as illustrated in the subsequent section.

STRESS AND ANXIETY

In addition to the anxiety-reducing benefits of exercise just described, there are important considerations in the competitive sport domain as well. Competitive sport is an important achievement area for children because physical competence is publicly demonstrated and socially evaluated (Scanlan & Passer, 1979). For the majority of young athletes, this situation does not pose a problem; however, left unchecked, highly

competitive sport contexts can lead to stress and anxiety. For example, in a significant number of children and youth, particularly at the elite levels of competitive sport, stress, anxiety and burnout are of major concern.

Stress is a process where there is an imbalance between the perceived demand of the situation and perceived ability of the individual to meet that demand, particularly under conditions in which failure to meet the demand has important consequences. Anxiety has two major components: trait anxiety, considered to be an enduring attitude or personality disposition, and state anxiety, or a negative feeling experienced at a particular point in time. Trait anxiety has been consistently shown to influence one's level of state anxiety (Gould, 1993).

Personal and situational factors affect stress and anxiety both before and after a competitive contest. Intrapersonal factors, which reflect perceived inadequacy in successfully meeting demands of competition, are related to pregame stress. These factors include high competitive trait anxiety, low self-esteem and low personal and team performance expectancies (Scanlan & Passer, 1979). In a study of female basketball players, Brustad (1988) found that players with high competitive trait anxiety had lower self-esteem and more frequent worries about evaluation and performance than did their counterparts with low competitive trait anxiety. Highly trait-anxious youngsters have less favorable views of their own competence and frequent worries about personal performance; in addition, they appear to worry extensively about receiving negative performance evaluations from others (Brustad, 1993b). Postgame stress is most influenced by actual response in meeting demands of competition. In one early study, game outcome dramatically influenced postgame stress reactions in girls, such that losers felt significantly higher stress than did winners (Scanlan & Passer, 1979).

Burnout is a special form of sport withdrawal and is a response to constant stress in which a young athlete ceases to participate in a previously enjoyable activity. The child may withdraw from sport physically, psychologically or emotionally because of her perception that it is impossible to meet the physical and psychological demands associated with such activity (Smith, 1986). On the basis of interviews with 15 adolescent athletes who had "burned out" of sports in which they had been intensively training, Coakley (1992) found that these children (a) saw themselves and were viewed by others only in terms of their specialized athletic roles, and (b) were involved in power relationships with others that left them feeling little sense of control over their own lives. Both situational and personal factors are associated with burnout in young athletes (Gould, 1993). Situational characteristics include such things as extremely high training volumes and time demands, demanding performance expectations that are either imposed by self or others, constant intense competition, inconsistent coaching practices

and little personal control in sport decision-making. Personal characteristics include perfectionism, a need to please others, nonassertiveness and unidimensional self-conceptualizations focusing only on one's athletic involvement.

Another troubling aspect of highly intense sport experiences can be a "win at all costs" philosophy which is emphasized in some elite female athletic arenas. Controversial training methods sometimes include verbal abuse and result in extensive physical and emotional damage to these young women. Ryan, a sports journalist, has reported that sometimes girls are called "fat cows" by the coaching staff. Not surprisingly, these athletes begin to get a distorted view of what they should (and do) look like. These elite girls—particularly in gymnastics and figure skating—are in a "race against time to transform into perfect little machines" (Ryan, 1995, p. 31). However, machines do not have emotional breakdowns, sustain psychological damage or commit suicide, yet these are experiences for some elite young female athletes. Coaches and trainers are in important positions of influence and power over these girls (Shisslak & Crago, 1992), and it is incumbent upon them to use such influence wisely and in the best interest of the athletes, rather than for personal glory or gain.

The focus of educators and coaches working with young athletes affected by stress and anxiety should be on emphasizing personal improvement rather than absolute outcome. It is also essential to help these girls maintain a healthy balance between the intense demands of sport and other important areas of their lives, such as academics and social development.

BODY IMAGE

From a psychological perspective, there are very important concerns about the relationship of body image to females' attitudes about physical activity and to actual behavior in sport and exercise settings (Gill, 1993). Physical activity is associated with enhanced self-esteem and body image (Plaisted, 1995; Snyder & Spreitzer, 1977) though female adolescents in general report greater body image disturbances and dissatisfaction than do males (Overdorf & Gill, 1994; Plaisted, 1995). Females are generally more negative about their bodies and are concerned with physical beauty and maintaining an ideal, thin shape (as identified by media and societal images), whereas males are concerned with size, strength and power (Gill, 1995). According to Hart, Leary and Rejeski (1989), such dissatisfaction with body image is associated with both low self-esteem and depression. Both social and sport-based pressures on female athletes to be thin can be implicated in this excessive focus on appearance (Plaisted, 1995). For example, societal pressure idealizing a body image that is not particularly healthy or attainable for many females has important consequences in terms of self-esteem and

disordered eating (see also Section III: Sociological Dimensions). Although the "ideal" physique in today's society is a slender, lean female body, it is much less than ideal with respect to physical and mental health (Gill, 1993). Sport-based pressures may include factors such as negative comments from coaches, teammates and officials and the standards and demands of the specific sport. Females that do not match this ideal, particularly those who are overweight or obese, are evaluated negatively and discriminated against (Gill, 1993). For example, some elite female swimmers lose self-esteem "due to derogatory comments or punitive measures for failing to meet what may be an unfair or unhealthy assigned weight standard" (Benson, 1991, p. 107).

One key problem regarding body image lies in the conflict between perception and reality. Even in the face of objective evidence to the contrary, many young females perceive themselves to be overweight. Overdorf and Gill (1994) found that female adolescent athletes perceived their bodies as heavier than they actually were. In their sample of children predominantly within normal weight ranges, 43.8 percent admitted to using some form of pathogenic weight control method at least occasionally because they felt the need to lose weight.

A study of adolescent girls found that more African-American girls reported having a good body image than did Native American or Caucasian girls.

Body image may differ among girls of different racial and ethnic backgrounds. A recent study of a diverse sample of adolescent girls (ages 11 to 17) has identified some of the factors related to low and high body image (Jaffee & Lutter, 1995). Girls who received positive comments about their appearance and achievements from their parents had more positive body images than did those who received negative comments. Playing on more school and nonschool sport teams was also associated with a better body image. With respect to ethnic differences, it was found that more African-American girls (44.0 percent) reported having a good body image than did Native American girls (33.3 percent) or Caucasian girls (31.8 percent). More than four times as many African-American girls as Caucasian girls considered themselves attractive and 12 times as many African-American girls as Caucasian girls reported liking the way they looked. With respect to perceived physical competence, 36.0 percent of the African-American girls said that they felt competent and capable about their bodies, while only 7.6 percent of the Caucasian girls did. The dramatic differences noted in this study illustrate the need to jointly consider sociological factors such as race and ethnicity with psychological factors to better understand the causes of variable self-perceptions.

It is also important to consider the relationship between physical activity participation and body image for overweight or obese girls, since overweight females have often been excluded from physical activity based on their physical characteristics, social pressures and psychological perceptions (Gill, 1993). Since the prevalence of overweight children has increased over the past 30 years among (a) females of all age

groups, and (b) females of color in particular, this is certainly a cause for concern (Wells, 1996) (see also Section I: Physiological Dimensions). While exercise is recommended as an important factor in the physical management of childhood obesity (Rowland, 1990), there may be corresponding psychological benefits as well (King & Tribble, 1990). However, since obese children typically possess negative attitudes toward physical activity, it is important to gradually introduce them to enjoyable forms of exercise so that they begin to feel more confident in their physical abilities and their self-image. When this happens, their sense of self-mastery can also improve (King & Tribble, 1990; Rowland, 1990).

Clearly these findings imply that negative body images are common even among physically active girls (Plaisted, 1995). Many physical activity leaders unwittingly contribute to these negative images. As will be illustrated in the next section, such preoccupation with physique can lead to dangerous attempts to control weight.

DISORDERED EATING

Disturbed body images—and the associated low self-esteem—lay the groundwork for weight preoccupation and disordered eating. Under these conditions, physical activity participation can often cross a very dangerous line. An increased level of physical activity is typical during the dieting and weight loss stage of eating disorders such as anorexia nervosa (Polivy, 1994). In this sense, excessive physical activity can have potentially harmful consequences. As Polivy suggested, "There is a range of compulsiveness connected to physical activity, with some individuals crossing a hypothetical line between what is normal and acceptable and what is destructive or pathological" (p. 883).

There are far more athletes who hold unhealthy attitudes and use unhealthy weight-loss methods (e.g., excessive exercise) than there are athletes with true eating disorders (Plaisted, 1995), although both are certainly of concern since they represent points along a continuum. Female athletes may be a high-risk group for developing either disordered eating patterns or actual eating disorders such as anorexia and bulimia (Shisslak & Crago, 1992; Thurstin, 1992), especially in: (a) sports with certain weight requirements, like lightweight rowing or horse racing, (b) sports in which low body fat is encouraged, like running and swimming, and (c) sports in which aesthetic appeal is important, like gymnastics, diving, ballet, body building and figure skating (Plaisted, 1995). Females in these sports sometimes use unhealthy weight loss methods such as self-induced vomiting and the abuse of diuretics, diet pills and laxatives.

Some of the influential factors in the development of disordered eating are unhealthy family dynamics, peer and teammate modeling and acceptance and pressure from coaches (Plaisted, 1995). For example, a study of elite female swimmers ranging in

age from 14 to 30 noted that almost 70 percent of the swimmers had coaches who told them to lose weight, in spite of the fact that 36 percent reported that pressure to lose weight was detrimental to helping them meet performance goals (Benson, 1991). A recent survey of youth coaches' attitudes, knowledge, experiences and recommendations regarding weight control revealed a tendency for these coaches to make decisions about the need for weight control in their athletes on the basis of appearance rather than more objective indicators (Griffin & Harris, 1996). Coaches also were more likely to say that female athletes needed to lose weight but male athletes needed to gain weight.

Examples from research in a variety of sports illustrate that there are additional factors that may contribute to disordered eating. In a sample of adolescent and college-age female gymnasts, Harris and Greco (1990) found that gymnasts were extremely concerned about their weight, although on objective measures, they were actually low in weight. Many considered themselves too fat and over half of them reported that they felt pressure from their coaches to lose weight. Similarly, a study of nine to 18-year old competitive swimmers (Dummer, Rosen, Heusner, Roberts, & Counsilman, 1987) found that females were particularly likely to misperceive themselves as overweight. These athletes based decisions to lose weight on these misperceptions as well as others' opinions of their weight. Furthermore, 15.4 percent of these girls used pathogenic weight loss methods to address weight concerns tied more to appearance than performance. Another study of adolescent swimmers (Taub & Benson, 1992) found that young female swimmers desired weight loss more than their male counterparts did, but neither males nor females reported much use of pathogenic weight control methods. Overdorf (1991) reported that the body self-perceptions of high school and collegiate female athletes differed markedly from the objective evidence, such that over half of the athletes saw themselves as heavy while only three percent were overweight by objective standards. Such standards are based on BMI (body mass index) which is widely used in the literature because it is moderately correlated with percent body fat (Brooks, Fahey, & White, 1996). Approximately half of the sample also reported using pathogenic weight control methods, including exercise abuse. Elite adolescent figure skaters, ballet dancers and swimmers were compared with nonathletes by Brooks-Gunn, Burrow and Warren (1988) and findings revealed that compulsive dieting behaviors were more common in the two sports emphasizing thin body shape (i.e., figure skating and ballet dancing) than among swimmers or nonathletes. A recent study comparing female high-school and college cheerleaders noted that the high-school cheerleaders "exhibited greater body dissatisfaction and disordered eating patterns" (Reel & Gill, 1996, p. 195) than did their college counterparts.

Participating in extreme measures such as disordered eating can have harmful,

even life-threatening consequences. It is important to note that it is only a subgroup of female athletes who develop clinical eating disorders, although the numbers are significant enough to be a cause for concern. Estimates of female athletes with eating disorders typically range from 10 to 20 percent. It may be, however, that it is not the sport context that causes the disordered eating, but rather that "individuals prone to eating disorders gravitate toward sports that require a low body weight" (Shisslak & Crago, 1992, p. 31). Given the available evidence, both avenues seem likely.

Societal attitudes toward physical appearance may also affect self-esteem, body image and eating behaviors in athletes with physical disabilities. In examining the literature on children with motor disability and their participation in sports, Steadward and Wheeler (1996) pointed out that coaches must consider complicating factors that affect dietary behaviors in addition to the existing cultural pressures on young athletes to attain ideal body shapes. They suggested a "triple jeopardy" of eating problems related to the child with a disability: the impact of physical activity on existing eating problems, disability-specific implications for eating problems and the role of cultural influences. Coaches of all athletes—both able-bodied and disabled—have an ethical duty not to promote questionable dietary practices or weight loss methods.

In spite of the many factors that contribute to disordered eating, females can nevertheless learn positive nutritional habits through their experiences in sport and physical activity.

In spite of the above-mentioned factors that often contribute to disordered eating, it is important to remember that all females can nevertheless learn positive nutritional habits through their experiences in physical activity participation. For example, many coaches and athletic trainers include nutritional advice as part of their educational responsibility to young athletes. Those working with obese youngsters on weight management typically adopt a combined approach of dietary changes, exercise, behavior modification and education (Rowland, 1990). (See also Section I: Physiological Dimensions.)

In summary, problems with disordered eating appear to affect a substantial number of young females. Participation in excessive levels of physical activity can be one dangerous method of weight control. Clearly, coaches must establish and encourage healthy nutritional habits among their female athletes.

CONCLUSIONS AND RECOMMENDATIONS

The information presented below represents conclusions and practical recommendations derived from this review of the literature. This information can be particularly helpful for those individuals working with females in sport and physical activity settings.

- Physical activity leaders must be aware of girls' motives for participating in physical activity (Jaffee & Ricker, 1993). Girls participate not only for fun, but also to get in shape, socialize and improve skills. We must provide opportunities to achieve these varied motives in physical activity programs.
- Even though girls may lack confidence in their sport and exercise capabilities, it appears that physical activity has tremendous potential to enhance a girl's sense of competence and control (Gill, 1993). Physical activity leaders should incorporate cooperative as well as competitive opportunities for girls to learn and practice physical skills in a nonthreatening environment.
- Sport administrators should emphasize moral education (e.g., prosocial) goals in physical activity and youth sport programs (Shields & Bredemeier, 1995). We must make prosocial, ethical reasoning processes and behavior an explicit, rather than implicit, part of the agenda.
- Coaches, parents and health care professionals need to identify girls who are at risk for excessive stress; this includes particularly those girls who have low self-esteem or unrealistic expectations about their abilities as well as those who experience frequent criticism from others (Martens, 1993). The most important factor to communicate to children is that they should be striving to achieve personal rather than outcome goals.
- With respect to disordered eating patterns, physical educators, exercise leaders and coaches can practice "preventive medicine" by being careful about the kinds of remarks they make to female students-athletes and clients about their weight and appearance. Additionally, because these individuals are in a primary position to recognize disordered eating patterns (Weinberg & Gould, 1995), they must be knowledgeable about the physical and psychological signs that accompany such behavior and be able to make referrals when appropriate.
- Professionals should consider whether they can enhance the sport experience for all individuals by incorporating such values as tolerance for error, cooperation and sharing, relaxation rather than stress, and process-orientation rather than outcome-orientation (Gill, 1993).

DIRECTIONS FOR FUTURE RESEARCH

The following are some priority areas for future research on the psychological dimensions of girls' participation in physical activity.

- **Accurately determine sport cessation rates.** Research studies need to be designed which better distinguish between sport-specific or sport-general dropouts versus sport transfers to ascertain if girls are leaving organized sport entirely or simply sampling a variety of sporting activities (Weinberg & Gould, 1995). These investigations should collect and analyze participation statistics and conduct exit interviews with children who drop out in order to identify negative reasons for cessation and address them in future programs.
- **Identify strategies to improve and enhance girls' self-perceptions of physical ability.** Scientific investigations must identify specific ways to enhance girls' self-perceived ability in sport and physical activity because prior research indicates girls often lack self-confidence in these important areas (Weinberg & Gould, 1995). Such analysis will lead to a better understanding of how sport and physical activity can contribute to self-perceptions whether they be positive or negative. Finally, studies should also develop and implement intervention strategies aimed at raising females' perceptions of their physical ability (Eccles & Harold, 1991).
- **Identify appropriate gender-specific teaching methods.** Although some isolated studies suggest that girls learn best in small, relaxed groups where children know each other, further investigation is needed to establish which will specifically determine how girls best learn motor skills (Garcia, 1994), sport skills (Wiese-Bjornstal & Weiss, 1992) and exercise skills (Marsh & Peart, 1988). It is important to gather and critically analyze such data because girls' learning styles may be different from the conventional approaches designed for boys.
- **Examine the ways in which females are affected by involvement in highly competitive sports.** Research must examine the impact—both positive and negative—of competitive sport participation for females. How sport influences moral development is a particularly fruitful line of inquiry. For example, the temptation to cheat or to take performance enhancing drugs (e.g., steroids) must be examined in conjunction with prosocial behaviors such as always being respectful toward opponents and officials.
- **Determine the various social factors associated with eating disorders.** Research studies must examine rates and causes of disordered eating patterns among adolescent female athletes since this may lead to the development of eating disorders and pathogenic weight control behaviors. It is necessary to study the influences of significant others in the process as well, particularly coaches, teammates, parents,

judges and teachers. We also need to establish whether adolescent athletes are more likely to have eating disorders than their nonathletic peers (Caldwell, 1993), and to design appropriate intervention programs.

- **Develop and implement more inclusive research agendas.** Future research must be expanded beyond an analysis of highly competitive sport and physical activity to include a broader range of activities (e.g., personal fitness) and settings (e.g., physical education classrooms). Additionally, studies should include participants from racially, ethnically, economically and ability-diverse backgrounds because gender interacts with these diversities in complex ways (Gill, 1993).
- **Utilize interdisciplinary research perspectives.** Much of the previously cited literature employed a unidimensional approach where only one particular sport-related dimension was examined (e.g., the psychological impact of participation). Future research must adopt a biopsychosocial perspective which simultaneously takes into account physical, psychological and social context variables (Gill, 1995). It is clear that contextual and maturational factors moderate the influence of socialization, physical ability and psychological factors on girls' participation in physical activity (Weiss & Glenn, 1992).

SECTION III:

Sociological Dimensions

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THE SOCIAL CONSTRUCTION OF FEMININITY CAN INFLUENCE girls' preferences for physical activity and their expressions of physicality. Gender is a key theme in physicality because most girls learn and reproduce "appropriate" female styles of movement (Young, 1990). Therefore, an exploration of the social factors that underlie the development of gender is necessary to understand girls' involvement in sport, exercise and physical activity.

This review begins with a discussion of how children's gender is socially constructed at a very young age. The second part examines how adolescence can exaggerate gender differences and how, in order to avoid compromising their femininity, many girls drop out of sport and physical activity altogether. The third part outlines the problems associated with lack of involvement in physical activity. The fourth part describes the benefits that accrue to those who are physically active. The fifth part discusses the influence of Title IX, which has significantly increased physical activity opportunities for girls, and as a result, seems to have changed the attitudes of some parents, teachers and physical educators regarding the importance of sport and active leisure for girls. The sixth part suggests specific ways to enable young girls' participation in physical activity, sport and leisure. The last section offers directions for future research.

In order to avoid compromising their femininity, many girls drop out of sport and physical activity altogether.

LEARNING GENDERED BEHAVIOR

The social construction of gender begins in early childhood perhaps as early as infancy, as children respond to cues from parents, teachers and others (Greendorfer, 1983). Children first identify notions of gender by focusing on a few obvious physical or external cues such as hairstyle, dress and name (Bailey, 1993). By age two, clear sex differences in interests appear (Pitcher & Schultz, 1983). By age three, children know many of the implicit social rules that guide feminine and masculine behavior. They may also start to believe that it is wrong for people to engage in cross-sex activities (Bailey, 1993; Ignico, 1990). Younger children (i.e., preschool to first or second grade) tend to adopt more stereotypical attitudes about gender than older children. Such early experiences often shape later behavior, although children may revise their ideas of

femininity or masculinity in the light of new information and experiences (Bailey, 1993). For example, a girl who believes only boys should play football and climb trees may revise her belief when she witnesses her favorite female cousin doing both.

Creating a gendered self is crucial to a child's sense of social competence and psychological well-being (Davies, 1989, 1990; Pitcher & Schultz, 1983), and for this reason, children internalize gender categories and practice corresponding behaviors. Through their own active efforts to engage in what they perceive as gender-appropriate behaviors, children take on social roles and characteristics labeled as feminine or masculine; this in turn restricts girls' opportunities and aspirations, unless they also receive cues from parents, teachers and others that are not limiting.

ESTABLISHING GENDER DIFFERENCE

One of the first things that contemporary society teaches children about the process of becoming gendered is that it involves establishing differences between females and males (Birrell & Cole, 1990; Duncan, 1990). These differences are not merely distinctions—they are sometimes interpreted as direct opposites (Beauvoir, 1952; Betterton, 1987; Connell, 1987; Kuhn, 1985; Orenstein, 1994). In particular, the media, parents, teachers and peers tell children in many obvious and subtle ways that if boys are one thing, girls are its opposite (Duncan, Messner, Williams, & Jensen, 1994; Kane & Greendorfer, 1994). Thus, a crucial component of social competence for many girls may depend on maintaining and defending that opposition.

The emphasis on gender opposition often shapes the ways in which children physically express themselves (Duncan & Sayaovong, 1990). Girls learn "a specific repertoire of gestures, postures and movements" (Bartky, 1988, p. 64) that can be quite different from that of boys; early on, girls discover that stereotypic femininity requires delicate, restrained movements (e.g., crossing the legs, folding the arms) and limited use of space (Henley, 1977; Young, 1990). Activities such as sports that require more vigorous movements and greater use of space are often socially coded as masculine. Although children may engage in activities coded for the other sex, the social norms that have been established for each gender, and the sense of identity that these norms may foster, are a powerful influence. As Hasbrook (1993) noted in her ethnography of grade-school children, both girls and boys believe that "girls are not supposed to be big, strong, powerful or physical; such attributes are [seen as] shameful and a source of offense to others, particularly boys" (p. 17).

In early childhood, children strengthen their sense of gender identity by associating with others of the same skill level and sex while generally rejecting opposite-sex groups, an arrangement that typically reinforces the differences between girls' and

boys' activities (Adler, Kless, & Adler, 1992; Bailey, 1993; Pitcher & Schultz, 1983). For example, girls often say that they prefer not to engage in boys' games and play (Green, 1987). This preference should not be surprising given the way that boys treat girls who encroach on "their" territory. As Hasbrook (1995) notes, "girls who display strength, power or physicality when interacting with boys run the risk of being disliked, chastised and/or marginalized" (p. 17). The notion of gender difference and opposition can occur even in kindergarten. For example, in recreational sports such as tee ball aimed at five and six year-old girls and boys, coaches and peers have been found to clearly communicate the stereotypic attitude that girls do not belong in such "male" activities (Landers & Fine, 1996).

Some girls may shun sport altogether to avoid compromising their femininity, or they may prefer sports and physical activities that appear to be more gender-appropriate: cooperative, aesthetically pleasing, expressive, graceful activities such as cheerleading, gymnastics, diving, swimming, tennis, figure skating and dance (Duncan & Hasbrook, 1988; Kane & Snyder, 1989; Metheny, 1965; Young, 1990). These activities contrast with those that are socially prescribed for boys: aggressive, competitive, territorial, strength-focused team sports that involve a great deal of body contact. Children as young as four have identified playing with dolls, picking flowers, dressing up, skipping and dancing as appropriate for girls, and activities such as football, baseball, basketball, soccer, hockey, karate and fighting as appropriate for boys (Bailey, 1993).

Girls possess the physical capabilities to perform well in all kinds of movement activities. What they may lack is the social support to do so.

Regardless of the social prohibitions against girls' participation in some forms of physical activity, a number of researchers argue that girls are not naturally less athletic than boys (Costa & Guthrie, 1994). While girls' activities may be different (such as jumping rope, swinging on the bars, performing complicated dance routines), they still require agility, coordination, strength and attentional focus (Bailey, 1993; Green, 1987; Hasbrook, 1995; Thorne, 1993). In fact, girls possess the physical capabilities to perform well in all kinds of movement activities. What they may lack is the social support to do so.

More and more girls are daring to cross the "gender divide" and are insisting on their right to play baseball/softball, basketball, football and soccer despite the fact that they may be pejoratively labeled as "tomboys," either by their parents and teachers, or by other boys and girls. This unfortunate tendency to label others was corroborated by Hasbrook's 1995 ethnographic study of a mostly African-American grade school in Milwaukee's inner city which suggested that certain cultures (i.e., African-American, Asian-American) may be less tolerant of girls who defy gender stereotypes than is white, middle-class society. Thorne's 1993 discussion of two working class schools with culturally diverse students revealed a similar intolerance for "tomboys."

Some girls may find the sport itself sufficiently rewarding to continue playing despite social disapproval (Nelson, 1991). Girls who manage to carve out a niche for themselves in boys' games are far more likely to be committed sports participants later in life. In a research report surveying seven thousand female sports enthusiasts, one of the most interesting findings was that the most active sportswomen shared the childhood experience of playing mostly with boys or in mixed gender groups, rather than mostly with girls ("Miller Lite Report on Women in Sports," 1985).

ADOLESCENCE: THE COSTS OF GENDER DIFFERENCE

A number of researchers have suggested that sharp declines in girls' self-esteem, academic performance, athletic involvement and body-image during adolescence are perhaps "heterosexualization" and "emphasized femininity" (AAUW and the Wellesley College Center for Research on Women, 1992; Daley, 1991; Orenstein, 1994; Pipher, 1994; Simmons & Blyth, 1987; Thorne, 1993). Pipher (1994) describes this adolescent fall as "a social and developmental Bermuda Triangle" in which girls "lose their assertive, energetic and 'tomboyish' personalities and become more deferential, self-critical and depressed. They report great unhappiness with their own bodies" (p. 19). In short, the social status of adolescent girls often depends on conformity to the feminine stereotype and the intensification of gender difference.

Girls may perceive that it is socially unacceptable to be strong, physical and athletically talented; this is the very definition of a popular boy. An erroneous but particularly persistent and long-standing belief is that sports are masculinizing and that physically active girls are more likely to become lesbians, or that all successful female athletes are lesbians (Cahn, 1994b; Kane, 1996; Lenskyj, 1986). Though this homophobic belief is unfounded, it leads some girls to avoid physical activity. It is also not surprising that as girls approach adolescence, many of them lose interest in vigorous physical activity and sport and may even stop participating altogether ("The Wilson Report: Moms, Dads, Daughters and Sports," 1988). For girls and boys, the dramatic physical transformations that occur during puberty are accompanied by equally dramatic social changes. However, although both sexes grapple with new roles and restrictions, those that adolescent girls must face present different challenges. While skill at sport is a significant factor in determining social status for many boys, physical attractiveness and success with boys tend to determine social status for girls (Adler et al., 1992; Thorne, 1993). This means that girls are placed in the very difficult position of being valued not for what they achieve but for how they look. Indeed, being pretty and being skilled at courtship rituals may take primacy over getting good grades, joining athletic teams or engaging in regular physical activity. The media (e.g., rock videos, television, teenage

magazines, romance novels) are particularly powerful influences at this age (Adler et al., 1992; Bailey, 1993; Duncan, 1994; Thorne, 1993). The popular media tend to sexualize, romanticize and objectify young women. Many girls start to regard themselves in these ways and are indeed treated as such by others (Adler et al., 1992; Pipher, 1994).

In spite of the findings mentioned above, there is growing evidence that cultural differences may temper mainstream expectations for girls' appearance and activities. For example, the "Women's Sports Foundation Report: Minorities in Sport" (1989) found that Hispanic, Caucasian and African-American high-school females who engaged in athletics perceived themselves as more popular than did their nonathletic counterparts in those same categories. Findings from this report also revealed that 87 percent of the mothers and fathers sampled "accept the idea that sports are equally important for boys and girls" (p. 1). This is an important area of research that needs further development.

MINORITY GIRLS: AT SPECIAL RISK

Some subgroups of girls face particularly daunting obstacles to participating in sport and physical activity. For example, some subcultures or minority groups are less tolerant of behavior that defies gender stereotypes such as "tomboyism" (Hasbrook, 1995). A retrospective study of working women found that girls of color were less likely than Caucasian girls to participate in intramural sports ("Miller Lite Report on Sports & Fitness in the Lives of Working Women," 1993). While 31 percent of Caucasian girls played intramural sports, only 19 percent of minority girls did so. These differences may be compounded by differences in socioeconomic status and geographical location (i.e., urban versus rural areas). Furthermore, girls of color were significantly less likely than Caucasian girls to receive encouragement from their parents to engage in athletic and fitness activities (11 percent versus 16 percent).

These findings were partly corroborated by another study that revealed that African-American girls were more likely to have parents who believed sports were more important for boys than for girls; that African-American girls were more likely to feel "boys make fun of girls who play sports"; and that African-American girls had fewer financial resources for lessons, equipment and transportation to games ("The Wilson Report: Moms, Dads, Daughters and Sports," 1988). Finally, according to the recently released Surgeon General's report on physical activity and health (U.S. Department of Health and Human Services, 1996)—which offers 1992 National Health Interview Survey data from the Youth Risk Behavior supplement—white, non-Hispanic females had higher levels of vigorous physical activity (49%) than black, non-Hispanic (42.3%) or Hispanic females (41.7%); males had statistically similar levels regardless of race/ethnicity status (60.2%, 62.7% and 56.7%, respectively).

THE CONSEQUENCES OF REJECTING PHYSICAL ACTIVITY

Unfortunately, rejecting involvement in sport and physical activity due to socialized stereotypes has its costs. (See also Section II: Psychological Dimensions.) The most obvious drawbacks are the health costs, both physical health (see also Section I: Physiological Dimensions) and mental health (see also Section IV: Mental Health Dimensions). Without regular exercise, girls and women tend to tire easily, have less energy (Rowland, 1990), and be more susceptible to infection and disease (Calabrese, 1990; Kramer & Wells, 1996). On the credit side, regular exercise makes young girls and women have more energy, feel better and cope more effectively with stress (Lutter & Jaffee, 1990).

Children who are physically unskilled may frequently be excluded from group activities and games (Ignico, 1990). Failure to develop a range of fundamental motor skills (a "movement vocabulary" [Bennett et al., 1987]) at a young age makes it more difficult to take up physical activities and sport later in life. Adolescents and adults lacking "movement literacy" (e.g., competence) find it doubly hard to learn new ways of moving their bodies, both because of the unaccustomed physical demands and because of the fear of appearing awkward and unskilled. Even if women wish to begin regular fitness activities for the first time in adulthood, fear of embarrassment may deter them (Nelson, 1991).

Successful sport experiences can also build confidence, self-esteem and positive body image, personal qualities that adolescent females especially need.

Another potential consequence of not participating in sport and physical activity is related to the development of one's character. Although conventional wisdom would have us believe that "sport builds character," research on character development in youths who participate in sport is equivocal. Some research findings suggest that sport involvement does not necessarily build character (Miracle & Rees, 1994; see also Section II: Psychological Dimensions). However, Fejgin's 1994 study found a weak, but significant, correlation between participation in competitive high-school sports and higher grades, higher self-concept, higher educational aspirations and fewer discipline problems. Despite these contradictory findings, there are certain unequivocal personal benefits (e.g., a sense of personal accomplishment, the development of social networks, the pleasure of movement) from participation in physical activities (Whitson, 1994).

BENEFITS OF PHYSICAL ACTIVITY

Sporting skills can lead to the development of important social skills. People form new acquaintances, consolidate old friendships and learn how to cooperate and negotiate on the tennis court, golf course or softball diamond. Successful sport experiences can also build confidence, self-esteem and positive body-image (Jaffee & Manzer, 1992; "Miller Lite Report on Women in Sports," 1985), personal qualities that adolescents especially

need (see also Section II: Psychological Dimensions). Participation in physical activity has also been linked to a lower incidence of depression (National Council for Research on Women, 1995) (see also Section IV: Mental Health Dimensions). Moreover, being physically strong is a practical benefit in many day-to-day undertakings: carrying grocery bags or suitcases, moving furniture, digging a garden, mowing the lawn. Those who view their bodies as useful and powerful are less likely to abuse their bodies. This is of particular importance since a number of contemporary disorders such as anorexia, bulimia and chemical abuse begin in adolescence (Chernin, 1981) (see also Section II: Psychological Dimensions). At all ages, involvement in sport and fitness activities is pleasurable and satisfying in and of itself (Pellett & Harrison, 1992).

The association between physical activity and other "performance domains" seems especially critical for minority students when it comes to the educational and academic benefits of involvement in varsity sports. For example, based on a nationwide probability sample of thirty thousand high-school students, a study conducted in the late 1980s revealed that Caucasian female athletes had lower school dropout rates than Caucasian female nonathletes in suburban and rural schools ("Women's Sports Foundation Report: Minorities in Sport," 1989). This study also indicated that Caucasian female athletes tended to do better in high school and college, feel more popular, be more involved in extracurricular activities and be more likely to aspire to community leadership than did Caucasian female nonathletes. In addition, Hispanic female athletes had a significantly lower dropout rate than did Hispanic female nonathletes—one-third lower. Furthermore, Hispanic female athletes were much more likely than their nonathletic counterparts to attend and stay in college. In relation to social involvement (e.g., participation in non-sport activities such as school newspaper and Girl Scouts), minority athletes of both sexes were more socially involved than nonathletes, and African-American and Hispanic athletes of both sexes scored higher on standardized tests.

In a study conducted during this same time period, Melnick, Vanfossen and Sabo (1988) found that athletic participation was strongly related to extracurricular involvement and modestly related to perceived popularity for high-school girls. However, these relationships are quite complex and may involve interactions with socioeconomic status, subcultures and specific sport experiences. For example, an intriguing analysis of longitudinal survey data by Hanson and Kraus (1996) found a relationship between girls' involvement in high-school sports and achievement in science (e.g., GPA, standardized scores). For Caucasian girls, participation in sports was positively associated with attitudes toward science (i.e., perceived relevance of math for one's future occupation) and access to science (i.e., course-taking). However, for African-American girls,

participation in sports was found to negatively influence their achievement in and access to science classes. In contrast, sports participation had no effect on the science experiences of Hispanic girls. These findings must be regarded with caution, however, since the data were first collected in 1980.

What seems clear from the preceding information is that females experience many benefits from their involvement in sport and physical activity. At the same time, some researchers have argued that females may have special contributions to make to physical activity and sport. For example, many of the young women who responded to the "Miller Lite Report on Women in Sports" of 1985 felt they could teach men something about humane competition. In addition, research on children's play styles suggests that girls put a high value on positive social interaction and self-expression, important antidotes to the competitive excesses of contemporary sport (Evans, 1986; Gilligan, 1982; Lenskyj, 1994; cf. Nelson, 1991).

In short, it is clear that girls can either gain or lose out on important benefits related to sport and physical activity. (And although the focus of this report is on girls, it is important to note that the same is also true for boys). While many barriers still exist, fortunately, attitudes and behaviors towards girls' involvement are changing. One significant instance of such social change was the passage of Title IX legislation. The following section outlines the impact of Title IX and suggests how people in key social roles such as teachers, parents and coaches can support girls' sport participation, and in so doing, can also transform our sporting institutions.

The future of girls' sporting participation depends upon monitoring progress toward compliance and vigorously working to educate the public.

EFFECTS OF TITLE IX

In 1972, the government mandated equivalent programs for males and females in schools receiving federal funds through the passage of Title IX. Combined with the advocacy efforts of the women's sports movement, this legislation had a significant impact by expanding physical activity opportunities for girls and women ("Miller Lite Report on Sports & Fitness in the Lives of Working Women," 1993) and changing attitudes about the appropriateness of sports for females (Durant, 1992). During the decade and a half that followed the passage of Title IX, the number of girls participating in high school sports rose from 294,015 in 1971 to 1,836,356 in 1986–1987 (Sage, 1990), and a 1993 survey showed that 37 percent of high-school athletes were female ("Miller Lite Report on Sports & Fitness in the Lives of Working Women," 1993). Another study ("Women's Sports Foundation Report: Minorities in Sport," 1989) reported that 30.5 percent of high-school girls took part in interscholastic sports in 1990–1991, compared to less than one percent of high-school girls who participated in such sports in 1971, before the enactment of Title IX. These figures not only reflect an unprecedented increase, but also

demonstrate that when girls' sporting involvement is vigorously supported by social institutions, they participate in record numbers.

It is important to point out, however, that Title IX has had an uneven history of enforcement and advances in equity. During leaner times, when educational funding has been decreased, fewer gains in equity and some backsliding have occurred (Blum, 1993; Fox, 1992). For example, from 1980 to 1988, federal enforcement of Title IX was slowed to a standstill. In 1988, the passage of the Civil Rights Restoration Act infused new life into equity efforts (Blum, 1993). Although many inequities have been identified and corrected, there are many more cases of discrimination that must be countered (Durant, 1992; Fox, 1992). As one analyst summarized, "The face of sex discrimination in athletics has changed. It was often no longer the purposeful exclusion of the past, but a collection of more subtle inequities that could be explained away by a lack of resources" (Fox, 1992, p. 50).

Unfortunately, institutions have attempted to reverse the Title IX gains made by girls and women in sport programs. For example, financially strapped school administrators and coaches have argued against equivalent sport provisions (National Women's Law Center, 1995). In addition, organizations such as the Women's Sports Foundation and the National Association for Girls and Women in Sport have offered assistance in the interpretation and implementation of Title IX. A Title IX Coalition was formed to disseminate information about Title IX to parents, athletes and administrators, and as a result of these efforts, it appears that some high schools and colleges are actively complying (D. Larkin, personal communication, May 1995). It seems clear that the future of girls' sporting participation depends in part upon continually monitoring progress toward compliance and vigorously working to educate the public.

CONCLUSIONS AND RECOMMENDATIONS

Because involvement in physical activity and sport is so beneficial for females of all ages, it is important to ensure that girls are given sufficient opportunities to develop their physical skills. How are girls to fully capitalize on the potential benefits of physical activity and sport? Much of the research previously cited offers specific recommendations for fostering and increasing girls' participation in physical activity, leisure and sport. Some specific guidelines for teachers, parents, physical educators, coaches and others who work with children follow.

- It is essential to eliminate gender-typing whenever possible. Activities should never be labeled as "girls' games" or "boys' games," "feminine" or "masculine" (Ignico, 1990; Pellett & Harrison, 1992; Thorne, 1993). When children come to school with preconceptions about "girls' games" and "boys' games," teachers may wish to introduce

new activities that aren't already gender-typed (e.g., hackey-sack, croquet, New Games).

- Leaders should avoid using sex as a basis for forming physical activity groups (Thorne, 1993). If children need to be grouped, use criteria that are gender-neutral (e.g., kids with brothers versus kids with sisters; kids who like dogs versus kids who like cats). Girls and boys need to work and play together, starting from an early age. Arbitrarily segregating girls and boys may create hostility and perpetuate power imbalances (Goodenough, 1987), and although there has been a great deal of recent interest in gender-segregated schools (see Sadker & Sadker, 1994), there is as yet no direct evidence that gender-segregated physical activity is desirable. The important consideration is to be sure that all children have adequate preparation. It is easiest for both sexes to play together and learn in small, non-competitive groups where children know each other well and have the prerequisite skills (Goodenough, 1987; Thorne, 1993).
- Professionals must actively intervene in the face of discrimination. When adults observe inequities or gender stereotyping on the playing field or in the classroom, it is often best to openly confront issues of sexism, prejudice or discrimination (Thorne, 1993). Encourage children to develop critical thinking about gender-based biases.
- Coaches and physical educators should give girls equal access and attention. Both girls and boys should play the important and interesting positions in a game (e.g., pitcher, goalie, forward). In addition, both should receive feedback to help improve their skills.
- All of us must challenge stereotypes whenever possible. When teachers choose games and lead activities, a female teacher might play football, a male teacher might jump rope (Thorne, 1993).
- Physical educators, exercise leaders and coaches should develop and implement new models of sport and physical activity. For example, professionals can emphasize learning new skills, having fun, cooperating and making friends (Lenskyj, 1994). Although competitive skills and attitudes may be valuable preparation for today's working world (D. Sabo, personal communication, 1996), competition should not be allowed to displace other sports values and experiences.
- Parents, coaches and physical activity leaders should avoid the use of gender-typed language. For instance, do not refer to athletes as "he" or use the generic male to mean both males and females. It may be helpful to tell children stories that allow them to imagine situations where traditional gender roles are reversed (Davies, 1989). At a very young age, children may seem resistant to change (Bailey, 1993), but adults can provide them with nonsexist information which they will rely on as they mature. (Pitcher & Schultz, 1983). Children who are in fifth and sixth grade may be ready to apply some critical thinking skills and challenge gender stereotyping.

DIRECTIONS FOR FUTURE RESEARCH

As our research agendas are developed and implemented, we must remember that providing girls with sufficient participation opportunities depends on rejecting stereotypic definitions of femininity and masculinity. As Davies succinctly puts it, to move beyond male-female dualism, "all we have to do is stop doing the work that maintains the difference" (1989, p. 136). The following are some priority areas for future research related to the sociological dimensions of girls' participation in physical activity and sport.

- **Examine the impact of participation in sport and physical activity for females across the lifespan.** The findings of this review suggest that involvement in physical activity from early childhood through girlhood to womanhood needs more in-depth investigation. Such research should encompass fundamental fitness activities and spontaneous, informal play and games as well as highly organized and competitive sports.
- **Expand our research agenda to be more inclusive of diversity.** There is very little information about how social factors such as ethnicity, class, religion or sexual orientation intersect with the construction of femininity and girls' participation in sport and physical activity. For example, only a handful of studies have examined how race affects girls' sport and fitness involvement, and even these studies have limitations—such investigations have failed to differentiate between African-Americans and the various ethnic/racial groups that comprise Asian-Americans, Hispanic-Americans, and American Indians and Alaskan Natives.
- **Determine the best strategies for enabling females' participation in sport and physical activity.** Future research needs to address a series of important questions related to strategy development and implementation. For example, how can we ensure that girls and women receive adequate opportunities for involvement in fitness, sport and play activities? How can we respect the needs of girls and women to feel competent using their bodies in a variety of settings? Our research should be guided by the principle that strategies for improving participation rates must also address the *quality* of the experience.

SECTION IV:

Mental Health Dimensions

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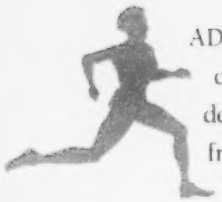

ADOLESCENCE IS A TIME OF SIGNIFICANT AND PRECIPITANT biological, cognitive and emotional changes for girls. Changes related to physical development, self-evaluation, peer standing and relationships with family and friends have a powerful influence on mental health and psychological well-being. Even though this time period is marked by transition, adaptation and stressful events, the majority of our youth traverse the landscape of adolescence successfully. However, failure to find adequate coping strategies can lead to emotional distress, anxiety disorders and clinical depression for some children and adolescents. Especially impacted are adolescent females who have been found to have higher rates of anxiety and depressive disorders than their male counterparts (Glied & Kofman, 1995; Lewisohn, Hops, Roberts, Seeley, & Andrews, 1993; McGrath, Keita, Strickland, & Russo, 1990; Nolen-Hoeksema & Girgus, 1994). "Adolescent girls are saplings in a hurricane. They are young and vulnerable trees that the winds blow with gale strength" (Pipher, 1994, p. 22). Although most girls "weather the storm of adolescence," it is important that opportunities to acquire the needed skills are provided for those who cannot. Young girls can learn to be strong, resilient and powerful, particularly as a result of physical activity and sport experiences.

Girls can learn to be strong, resilient and powerful, particularly as a result of physical activity and sport experiences.

This section of the report offers both empirical and anecdotal evidence that supports increasing the use of exercise and sport as promising alternative psychological health interventions. In contrast to the broad approach of Section II: Psychological Dimensions, this section focuses specifically on mental health, especially its maintenance among at-risk adolescent girls. The first part reviews empirical support for the positive relationships among exercise, fitness and mental health, particularly focusing on the effect of exercise on anxiety and depression, two disorders prevalent among adolescent females. The second part presents both empirical and anecdotal evidence concerning female adolescent mental health and the use of exercise and sport as an ameliorative influence. The third part highlights some conclusions and recommendations as well as identifies significant areas of needed research.

THE EFFECTS OF EXERCISE ON MENTAL HEALTH

Research has provided significant findings related to physical activity in two distinct areas of interest for mental health professionals: the use of sport and exercise to enhance psychological well-being, and its use to reduce problematic levels of anxiety and depression among individuals with mental health problems (Surgeon General's Report on Physical Activity and Health, USDHHS, 1996). A summary of this information is presented in three areas: 1) exercise and the enhancement of psychological well-being; 2) exercise and the reduction of problematic levels of anxiety and depression; and 3) hypotheses advanced by scholars and educators to explain the psychological benefits of exercise and sport.

Exercise and the Enhancement of Psychological Well-Being

In general, research has demonstrated that engaging in exercise and physical activity significantly enhances mental health. Participating in an exercise program has a positive impact on elevating mood and improving self-concept and self-esteem (Brandon & Loftin, 1991; Jackson & Marsh, 1986; King, Taylor, Haskell, & DeBusk, 1989; MacMahon, 1990; Mutrie & Biddle, 1995). Plante and Rodin (1990) and Plante (1993) determined from extensive meta-analyses that exercise has a positive impact on enhancing mood, self-concept and self-esteem. In addition, feelings of depression, anger and anxiety tend to dissipate after exercise (Smyth, 1991).

Optimism is crucial to psychological well-being and has been shown to be influential in achievement behavior, self-mastery and enhanced motivation. A recent investigation by Kavussanu and McAuley (1995) demonstrated the relationship between high physical activity and optimism. Their findings also revealed an "inverse relationship between regular exercise and trait anxiety levels" (p. 254), suggesting that those who exercise have lower anxiety. In an earlier study, Buffone (1984) discussed the potential of exercise as a psychological enhancer and stated that "current research in counseling, psychology and medicine points to physical exercise's positive effect on mental health. Running and other forms of exercise or sport participation, seem to build confidence, alleviate moderate anxiety and reactive depression, increase body awareness and image, reduce weight, promote habit control and improve sleep" (p. 222).

The potential benefits of physical activity participation such as "self-concept, self-esteem and body concept" are especially important for the emotional well-being of women (Berger, 1984b, p. 172). Jackson and Marsh (1986) concur with this finding stating that the emotional benefits of exercise participation are especially important to women, particularly the significant improvements in self-concept found in athletic women.

Recent studies have indicated that involvement in exercise, rather than actual fitness levels, may be the key to enhancing mental health. For example, in a study investigating the positive influence of physical activity on psychological well-being—particularly as it relates to the ability to cope with stressful situations—Long (1993) suggested that exercise can be used to function as a coping mechanism for stress, to regulate emotions and mediate stress reactions. This same author advocated physical activity that involved large muscle groups, such as jogging, swimming and cycling. Similarly, Thirlaway and Benton (1992) determined that it is participation in physical activity, rather than actual physical fitness, that has greater impact on improving mental health. Finally, Biddle (1995) suggested that there may be no empirical basis to support the necessity of rigorous exercise regimes in order to impact feelings of well-being.

In a comprehensive review of the research findings, Singer (1992) found that there are many psychological rewards of physical activity. Some of these are improved self-image, increased self-confidence, positive changes in mood, relief of tension, relief of premenstrual tension, increased alertness, increased energy and increased ability to cope.

Exercise and the Reduction of Anxiety and Depression

It is estimated that as much as 25 percent of the population suffer from anxiety and depressive disorders which may range in severity from mild to more severe forms (Singer, 1992). Such mental health states have been shown to be particularly responsive to exercise and/or physical activity that can decrease many of the symptoms associated with a number of psychiatric conditions (Plante, 1993; Surgeon General's Report on Physical Activity and Health, USDHHS, 1996).

There are specific criteria for the diagnosis of acute depression including nine symptoms of depression: (a) depressed mood, (b) diminished interest or pleasure in most activities, (c) significant weight loss or weight gain that is unintentional or a daily decrease or increase in appetite, (d) insomnia or hypersomnia, (e) psychomotor agitation or retardation, (f) fatigue or loss of energy, (g) feelings of worthlessness or excessive or inappropriate guilt, (h) diminished ability to think or concentrate or indecisiveness, and (i) recurrent thoughts of death or suicide attempts (American Psychiatric Association, 1994). The criteria for a major depressive episode is having five or more of these symptoms present for a two-week period.

A position paper from the International Society of Sport Psychology (ISSP) states that there is clinical evidence that exercise can have a beneficial effect on some psychiatric disorders. "Physical activity can be a promising aid" for people suffering

from symptoms of depression (Singer, 1992, p. 199). Further, the majority of studies show that both aerobic and nonaerobic exercise can have an antidepressive effect with those patients experiencing mild to moderate depression (Martinsen, 1995; Plante, 1993). However, most published studies have been concerned with directly impacting the symptoms of depression with no differentiation made between the levels of depression of participants and with few studies specifying the degree to which clinically diagnosed participants were utilized (Martinsen, 1995; North, McCullagh, & Tran, 1990). This section focuses on persons who have moderate rather than severe mental health problems (e.g., mild versus severe depression).

In two studies, Greist (1987) found exercise to be effective with clinically depressed outpatients in reducing moderate depression. In addition, exercise was shown to be as effective as group psychotherapy: those who continued to exercise maintained their improvements, while those who only participated in group therapy failed to maintain some of their improvements. Greist and Jefferson (1992) found that a combination of walking and running on a regular basis was highly effective in reducing mild to moderate depression.

Findings confirmed that exercise was as effective as psychotherapy in reducing depression and that exercise combined with psychotherapy yielded increased effectiveness.

North, McCullagh and Tran (1990) conducted a meta-analysis of studies that ranged from a general population of individuals with depressive symptoms to clinically depressed participants. The authors concluded that both acute and chronic exercise in either aerobic or anaerobic forms significantly decreased unipolar depression. The largest decreases in depression levels were in participants under medical and psychological care. Exercise therapy (both aerobic and anaerobic) was a better antidepressant than relaxation and other "enjoyable" activities, and "exercise was as effective in decreasing depression as was psychotherapy" (p. 404). Exercise in combination with psychotherapy was a better intervention than exercise alone.

Similarly, other extensive reviews of the relevant research on exercise intervention with clinically depressed patients suggest that both aerobic and nonaerobic exercise are as beneficial as psychotherapy in reducing depression (Martinsen, 1994; Martinsen & Stephens, 1994). These studies were with inpatient and outpatient populations with mild to moderate unipolar depression; no sound empirical studies were found which addressed the value of exercise intervention in bipolar, psychotic or melancholic disorders. It was also noted that no study has compared exercise and medication in the treatment of depression.

A recent meta-analysis of the research literature differentiates between clinical and nonclinical studies (Biddle, 1995). This review concluded that exercise has antidepressant properties with both clinical and nonclinical populations, across all age groups, both genders and using all modes of exercise. The findings confirmed that

exercise was as effective as psychotherapy in reducing depression and that exercise combined with psychotherapy yielded increased effectiveness.

In several meta-analyses and single studies, researchers have reported positive sport- and exercise-related effects on anxiety or on the joint examination of anxiety and depression. For example, Long and van Stavel (1995) reviewed 40 studies on the effects of exercise on reducing anxiety. The findings supported the view that "exercise training is an effective means of anxiety reduction" (p. 181). The authors also stated that the most important finding was that exercise was especially effective for those people with elevated levels of stress. Brown (1987) reported successfully using a prescription of exercise as a therapeutic intervention with anxious and depressed outpatients for many years and found this therapy to be effective and powerful for reducing anxiety and depression levels. Similarly, through a comprehensive analysis of the relevant literature since 1980 on nonclinical populations, Plante and Rodin (1990) found that exercise has been consistently shown to decrease mild to moderate anxiety, depressive symptoms and stress.

Plante (1993) conducted another meta-analysis of the research evidence regarding the use of aerobic exercise as a preventative and treatment intervention for more serious psychopathology. He found that this intervention was used most commonly with depressive and anxiety disorders. "Exercise was found in many studies to be an effective adjunct treatment with panic disorder and other anxiety-disorder patients" (p. 366).

Russoniello (1991, 1992) studied the effects of exercise therapy on both physiological and psychological variables associated with mood and stress among alcoholic patients in a rehabilitation center setting. He found significant positive results including decreases in sympathetic arousal (cortisol levels) and increased positive mood states (POMS) following the use of controlled exercise regimens. While these clinically-oriented studies have usually employed an aerobic program of walk/jog/run for exercise, other literature has demonstrated that both aerobic and nonaerobic exercise programs are effective in reducing depression and anxiety and increasing self-concept (Holloway, Beuter, & Duda, 1988; Singer, 1992; Stein & Motta, 1992).

The following conclusions of the International Society of Sport Psychology (Singer, 1992) are based on examining the research literature regarding depressed and anxious patients:

- Exercise can help reduce state anxiety.
- Exercise can help decrease the level of mild to moderate depression.
- Long-term exercise can help reduce neuroticism and anxiety.

- Exercise may be an adjunct to the professional treatment of severe depression.
- Exercise can help reduce various kinds of stress.
- Exercise can have beneficial emotional effects across all ages for both sexes. (p. 201)

Hypotheses to Explain the Psychological Benefits of Exercise and Sport

It has been well documented that exercise positively impacts psychological well-being and functions as an antidepressant (Johnsgard, 1989; MacMahon, 1990; Martinsen & Stephens, 1994; North et al., 1990; Oler et al., 1994; Plante & Rodin, 1990). However, there is no clear theory concerning underlying mechanisms to account for these effects. Several hypotheses have been offered to explain how exercise functions to reduce symptoms of depression, though none has been consistently sustained in empirical studies. It is possible that the beneficial consequences of exercise and physical activity may be mediated by a physiological, chemical or psychosocial component. According to Johnsgard, "It may turn out to be the case that all of these hypotheses will be shown to play a legitimate role in explaining the antidepressant effects of exercise" (1989, p. 146).

Biochemical Mechanisms

Numerous biological and chemical hypotheses have been proposed to explain the effects of exercise on positive psychological health. One theory implies that exercise increases levels of brain norepinephrine and serotonin levels and that the release of endogenous opiods from the pituitary gland act as a mood enhancer and antidepressant. Another hypothesis is the thermogenic theory which suggests that increases in body temperature have a tranquilizing effect (Greist & Jefferson, 1992; Page & Tucker, 1994; Plante, 1993; Sime, 1987; Tuson & Sinyor, 1993).

According to Greist and Jefferson, "some experts believe that simply moving large muscle masses in regular rhythmical ways is inconsistent with depression" (1992). North et al. (1990) endorse a psychobiological theory to explain the antidepressant effect of exercise. They suggest that there are both biochemical and psychological changes resulting from exercise that influence depression.

Psychosocial Mechanisms

Several psychosocial hypotheses have been presented concerning the connection between exercise and improved perceptions of well-being. Exercise and physical activity can furnish a sense of achievement, promote feelings of personal control, provide a channel for emotional release and reconnect one to the play of childhood

(Baumel, 1995). The positive feelings derived from exercise and physical activity may also be due to feelings of mastery, self-efficacy and accomplishment of a task (Bandura, 1990). Involvement in physical activity has also been suggested to provide a sense of competence, an emotional catharsis and a form of biofeedback, which teaches participants how to regulate their emotions (Brown & Siegel, 1988; Fox, 1988; Kavussanu & McAuley, 1995; Plante, 1993; Sime, 1987; Stein & Motta, 1992; Tuson & Sinyor, 1993).

Other psychosocial mechanisms that have been suggested include the possibility that physical activity provides a distraction from problems, and that exercise can offer a change of scenery and divert one's mind from anxious thoughts (Baumel, 1995; Long, 1993; Martinsen & Stephens, 1994; Norris, Carroll, & Cochrane, 1991; Page & Tucker, 1994; Thirlaway & Benton, 1992). King et al. (1989) found that among their participants, awareness of secondary physical changes (e.g., weight loss) was responsible for some of the psychological benefits associated with exercise. For depressed females, it may be a combination of the physical benefits (e.g., increased endurance, reduced fatigue, improved appearance and strength) and the psychological benefits (e.g., increased competence and success, becoming better organized, loss of passivity and helplessness) that works to alleviate depression (Berger, 1984a).

Social interactions have been suggested as mediators to the perceptions of improved well-being associated with sport and exercise. Social relationships (e.g., coach/athlete) that function in place of or in addition to parental relationships, as well as peer support, have also emerged as significant factors in a few studies (Oler et al., 1994; Page & Tucker, 1994; Thirlaway & Benton, 1992).

FEMALE ADOLESCENTS AND MENTAL HEALTH

This section focuses on three themes found in the literature. The first theme concerns the mental health problems of girls, especially during their adolescence. An alarming feature of this review is the prevalence of depression as well as the growing awareness of Post-Traumatic Stress Disorder (PTSD) symptoms among some adolescent girls. The second theme concerns the empirical and anecdotal material on programs using exercise as an intervention for adolescent girls. The third theme focuses on sport and exercise as preventative measures in the mental health treatment of adolescent females.

The research literature on female mental health is sparse (McGrath et al., 1990; Mufson, Moreau, Weissman, & Klerman, 1993). Some prevalent psychological disorders that affect adolescent girls (and boys) are depression, anxiety disorders and suicidal

ideation (Nolen-Hoeksema, 1990). Adolescent female depression, with its many co-occurring manifestations, is of great concern both to professionals and to loved ones.

Research on adolescent depression, consistent with other depression research, has focused on three constructs: depressed mood, chronic syndromes and acute disorder. All share a common set of symptoms. The duration and severity of the symptoms are critical factors in determining the level of depression (Compas, Ey, & Grant, 1993). Furthermore, a noted author addressing depression among females has criticized the trivialization of reported symptoms of depression which fail to meet the criteria for acute depression when "the line between subclinical and clinical levels of depression is blurry at best" (Nolen-Hoeksema, 1990, p. 5).

Female Adolescents and Depression

The Harvard Medical School's Mental Health Newsletter estimates that as many as nine percent of adolescents suffer from serious depression (Grinspoon, 1993). However, gender differences have been discovered in this domain: there are twice as many adolescent females as males suffering from depression (Glied & Kofman, 1995; Greist, 1987; Grinspoon, 1993; Mufson et al., 1993; Nolen-Hoeksema & Girgus, 1994; Singer, 1992). Many girls feel pain and confusion during adolescence. In addition, they are often expected to have emotional difficulties during this time period. But socially withdrawn adolescents with dramatic mood swings, cognitive distortions and increasing conflicts with parents and peers are not the norm and such behavior should be considered as possible manifestations of psychiatric illness (Mufson et al., 1993; Pipher, 1994). Similarly, Grinspoon (1993) suggests that serious despair, rage and suicidal fantasies are not the norm.

There are twice as many adolescent females as males suffering from depression.

Adolescent depression resembles adult depression. The similarities include recurring symptoms of "negative self-cognition, depressed mood, sleep and appetite disturbances, tearfulness, difficulty functioning at job or school due to poor concentration and suicidal ideation" (Mufson et al., 1993, p. 25). There are some developmental differences between adolescent and adult depressives. Adolescents experience more hypersomnia and hyperphagia (i.e., sleeping and eating disorders) than do adults. An important distinction between these two groups is that depressed adolescents make more suicide attempts than depressed adults. Female adolescent depression has its own distinct causes. Girls are often unprepared for the bodily and social changes that mark their lives during this period. These changes engender feelings of shame, guilt and inferiority (Grinspoon, 1993; McGrath et al., 1990; Mufson et al., 1993; Pipher, 1994).

There has been a substantial rise in the rate of adolescent suicide in the last 30

years. Suicide has been found to be correlated with depression in adolescents and one in three depressed adolescents has suicidal thoughts (McGrath et al., 1990; Nolen-Hoeksema, 1990). Mary Pipher, a clinical psychologist and expert in the field of female adolescent psychotherapy, describes the manifestations of female adolescent depression in the following statement:

> It makes some adolescent girls sluggish and apathetic, others angry and hate-filled. Some girls manifest their depression by starving themselves or carving their bodies. Some withdraw and go deep within themselves and some swallow pills. Others drink heavily or are promiscuous. Whatever the outward form of the depression, the inward form is the grieving for the lost self, the authentic girl who has disappeared with adolescence. (1994, p. 149)

There are many types of psychological and biochemical therapies that have been utilized for the treatment of depression in the adult population. But there are few studies that "address the issue of differential effectiveness of treatment strategies for depressed female adolescents. It should not be surprising, therefore, that the literature on treatment outcomes for depressed female adolescents is almost nonexistent" (McGrath et al., 1990, p. 83). The information that we do have indicates that therapeutic interventions that are effective for treating adult depression (e.g., traditional "talk" therapy and antidepressant drugs) are often ineffective for adolescents (Grinspoon, 1993; Harrington, 1992; Mufson et al., 1993). Published studies on the efficacy of pharmacotherapy for depressed adolescents have not yielded significantly positive results (Garland, 1994; Harrington, 1992; Hazell, O'Connell, Heathcote, Robertson, & Henry, 1995; Kutcher et al., 1994). The reasons that adolescents fail to respond to antidepressant medication are not yet known (Grinspoon, 1993; Mufson et al., 1993). Additionally, for some clients there are mild to serious side effects in response to antidepressant drug therapy (Johnsgard, 1989; Mufson et al., 1993).

Several contemporary writers suggest that a cost effective, alternative treatment is exercise therapy (Johnsgard, 1989; MacMahon, 1990; Stuhlmiller, 1994; Welsh & Labbe, 1994). A prescription for exercise can provide enrichment to the whole girl. Exercise can offer adolescent girls improved cognitions about their body image, self-esteem and competency. Exercise therapy can also promote physiological well-being with its increased energy and improved sleep and eating patterns (Johnsgard, 1989; Martinsen & Stephens, 1994).

Post-Traumatic Stress Disorder

Sadly, for some of today's adolescents and children, unchosen circumstances of their lives expose them to physical and sexual abuse, violence and disaster to such an extent they reflect the symptoms of Post-Traumatic Stress Disorder (PTSD) (Parson, 1994;

Wilson, 1994). Recent studies of institutionalized children from dysfunctional families identified eight common categories of stressors in their lifestyle (Wilson, 1994). These stressors were said to have low-level, insidious effects which were compounded or additive over time producing symptoms similar to "classic" PTSD (Berk, 1992). The stressors include: (a) failure to provide positive role modeling, (b) failure to protect from continued trauma or aid to experience safety, (c) failure to provide structure, (d) failure to provide unconditional positive regard, (e) failure to teach suitable problem-solving methods,
(f) failure to teach the norms of society, (g) chaotic, conflicted, "abnormal" environments which become the normal baseline of experience, and (h) high levels of inconsistency, unpredictability, role reversal and anxiety-inducing intrafamilial or interpersonal relationships. It is the position here, and throughout this section of the report, that the structural setting of sport and exercise programs can be organized to supply the antidote to the very deficits identified in the backgrounds of these children.

Unfortunately, there is a paucity of research on these matters. However, a few studies have shown that exposure to violence and family dysfunction is associated with PTSD symptomology among nonclinical children and adolescents (Foa, Riggs, & Gershuney, 1995; Schwarz & Perry, 1994), male juvenile offenders (Burton, Fox, Bwanausi, Johnson, & Moore, 1994) and male and female adolescents who have been physically abused (Pelcovitz et al., 1994). After a review of the literature (Miller-Perrin & Wurtele, 1990), it was stated that "clinical and empirical literature shows that PTSD symptomology often develops in adolescence and adulthood among female survivors of sexual abuse" (p. 91).

In order to grasp the seriousness of this problem, it is necessary to estimate the prevalence of sexual abuse among adolescent females. In a recent random sample of 930 adult women, it was reported that, before the age of 17, 12 percent had experienced intrafamilial sexual abuse and 26 percent had been abused by someone not in the family (McGrath et al., 1990). Further, in a study of the records of 188 male and female psychiatric inpatients discharged over an 18-month period, 53 percent of females and 23 percent of males had been abused. Of the 28 patients who were adolescent, 75 percent had been abused (McGrath et al., 1990).

Exposure to violence and physical and sexual abuse is a phenomenon which cuts across social classes and neighborhoods. It has been pointed out, however, that additional forms of trauma, including ethnocultural strife and cultural alienation, can add layers of challenge for adolescents (Parson, 1994). Parson specifically describes "post-traumatic ethnotherapy" as a therapeutic orientation characterized by ethnic/cultural sensitivities. Such an orientation will enhance amelioration of the

damages caused by stressors both natural (e.g., housefire, earthquake, hurricane) and political (e.g., being the victim of having a swastika placed in your yard or painted on your house, racial epithets directed toward you or your children).

In the PTSD literature, voices are calling for experimentation with and use of exercise and sport programs for therapeutic purposes. Stuhlmiller (1994) calls action-based programs "one of the most powerful, yet generally overlooked approaches to PTSD" (p. 386). One program, Ending Violence Effectively (EVE), was specifically designed for females who had been victims of rape, incest, physical and verbal assault, sexual harassment and other forms of trauma. In wilderness settings, traditional counseling was offered in addition to an action-based component which included "movement and meditation, massage, relaxation training and hypnosis" (p. 387).

In order to provide a possible explanation for the effectiveness of exercise and sport programs, Stuhlmiller (1994) pointed out that over time, exposure to trauma has been shown to result in reduced production of serotonin, catecholamines, norepinephrine and endogenous opiods. These biochemical deficiencies are associated with the avoidance, emotional constriction and depressive symptoms characteristic of PTSD. As has been pointed out throughout this report, the role of regular exercise in increasing these chemical levels, thereby contributing to a heightened sense of well-being, has been substantiated (Page & Tucker, 1994; Plante, 1993; Tuson & Sinyor, 1993).

Exercise and Adolescent Mental Health

Much more research is needed regarding the effect of sport and exercise on female adolescent mental health, but promising findings are emerging in recent investigations. Holloway et al. (1988), studied the effectiveness of strength training on self-efficacy for adolescent girls. When these girls participated in free-weight training, they reported significant gains in self-efficacy and confidence levels. Participants experienced improvements in self-esteem for their bodies in particular and for their lives in general. In another study working with a junior high and high school population, more than three hundred adolescent girls reported an inverse relationship between experienced life stress and exercise participation. Based on longitudinal observations, Brown and Siegel (1988) concluded that exercise was a viable technique for stress reduction.

Koniak-Griffin (1994) conducted a study in which an aerobic exercise program was introduced to nonclinically depressed pregnant adolescents. The results demonstrated a significant decrease in depressive symptoms and an increase in total self-esteem. The researcher suggested that participation in the aerobic exercise program "may have created general feelings of self-accomplishment among exercisers which

offset symptoms of depression and reduced the adverse impact of the crisis of premature parenthood" (p. 259).

Oler et al. (1994) explored the relationship between participation in athletics and depression, suicidal ideation and substance abuse in male and female adolescents. The researchers conducted a survey and compared high-school athletes to nonathletes. They report that "Athletic participation is a marker for decreased likelihood of depression and some high-risk behaviors in adolescents, particularly suicide ideation" (p. 784). The study also revealed that female athletes reported fewer suicide attempts than female nonathletes.

In two studies with adolescents, Norris et al. (1991) determined that aerobic training was effective, to a statistically significant degree, in improving psychological well-being. In a large study of the impact of exercise on psychosocial functioning in male and female high school students, Page and Tucker (1994) found that physically active adolescents tend to feel less lonely, shy and hopeless.

Physically active adolescents tend to feel less lonely, shy and hopeless.

Four studies were identified that focused on clinically diagnosed or special populations. Horn and Claytor (1993) found that exercise as a therapeutic intervention had the greatest impact on the self-esteem of emotionally disturbed youth. Studying a small group of inpatient adolescents, researchers Brown, Welsh, Labbe, Vitulli and Kulkarni (1992) found significant improvements in depression and anxiety due to an aerobic training procedure. Fridinger and Dehart (1993) studied an inpatient adolescent drug and alcohol treatment program that had a distinctive component of exercise and physical activity incorporated as an adjunct to the psychotherapy intervention process. Exercise was found to be an effective coping strategy for stressful situations: using a walk/jog procedure, the authors reported significant reductions in depression and anxiety levels. Similarly, MacMahon and Gross (1988) conducted a study on incarcerated adolescent males (ages 14 to 18) who participated in a three-month aerobic exercise program. They found a significant increase in self-concept and a decrease in depression levels.

Anecdotal Evidence from the Field

"It is important to realize that we are all doing the same thing—working to build self-esteem, strengthen mental health, prevent pregnancy and AIDS and prevent drug abuse. There is a real need to integrate exercise and sport into existing programs," says Dr. Debra Klein-Walker, Assistant Commissioner, Bureau of Family and Community Health, Massachusetts Department of Public Health.

The following examples offer tangible support for the use of exercise and physical activity as a treatment intervention for the mental health of adolescent females.

The most successful programs provide meaningful and consistent activities, are goal-oriented and are administered by a knowledgeable and supportive interdisciplinary services team. It should be noted that the information provided in this section comes from phone interviews with practitioners and thus provides anecdotal rather than empirical support.

Montanari Residential Treatment Center

Working with emotionally disturbed youth at the Montanari Residential Treatment Center, in Hialeah, Florida, the staff reports success with exercise and sport as a treatment intervention with adolescent girls.

Columbus College Counseling Center

From 1980 to 1986, Dr. Lawrence Meisel was involved in a program that integrated both aerobic and nonaerobic exercise training into a counseling treatment program for inpatient delinquent adolescents. The program involved running and weight lifting and the entire counseling staff provided outstanding support. According to Meisel, one of the major results of this cost-effective intervention was that after six months of training, the girls and boys showed considerable improvements in self-concept and confidence and always had significantly more internal locus of control. Meisel would run with the students and, at the point where they were struggling, he would whisper in their ears, "This is what it feels like to want to give up—but in about ten minutes you *will* know what it means to succeed!"

Villa Maria Treatment Center

Greg Mobley, a therapist at the Villa Maria Treatment Center near Baltimore, Maryland, has found exercise and physical activity interventions more successful if they are coeducational. The exercise training has had a positive effect on other programs at the center. He reports that exercise and sport provides the adolescent girls with improved body image and that they are more relaxed and cooperative in group therapy sessions.

Three Springs Treatment Center

Three Springs Treatment Center in Huntsville, Alabama, has a physical activity program that is supplemental to the main therapeutic program. It is a challenging outdoors program that includes such activities as a ropes course, caving, rappelling, rock climbing, backpacking, hiking and orienteering. They have had success with

adolescent girls in improving self-esteem and teaching goal-setting and problem-solving skills (Jim Chritzberg, Director).

Millcreek Schools Psychiatric Residential Treatment Facility

At the Millcreek Schools Psychiatric Residential Treatment Facility, in Magee, Mississippi, Kelly Alderman is in charge of the sport and exercise programs for the inpatient adolescents. The professional staff has noted benefits from exercise intervention with the emotionally disturbed and behaviorally disordered patients. The adolescents are more stable, aggression has decreased, and the staff found a "marked reduction in stress" following the exercise intervention program.

Project Light

Project Light was started in 1991 as a Boise State University research study. The research conducted confirmed that exercise reduces symptoms of depression and depression-related illnesses in many cases. It has now developed into an ongoing program in the community to promote exercise as one of the treatment modalities for persons suffering from depression. Of special note is the integration of the medical community into this project. Physicians and mental health professionals are encouraged to include this exercise program as a treatment modality in addition to traditional medication and psychotherapy treatments.

Feelings of powerlessness associated with adolescent depression and anxiety can be counteracted by exercise and sport, where young girls and women can gain feelings of personal control.

The funding for the project came from the Boise Chapter of the National Alliance for the Mentally Ill via the Healthwise Medical Self-Care Small Grants Fund. Persons with depressive disorders referred by mental health care professionals are not charged for participating in the eight-week program. Participants engage in three 45-minute small group exercise sessions per week. Each session consists of a variety of prescribed exercise experiences in stretching and warm-up activity, resistance and flexibility training and cardiovascular exercise (e.g., walking, jogging). The workouts are of moderate intensity in a noncompetitive setting. A "buddy system" is developed for the participants. A follow-up group class is conducted once a week for an entire year to promote program maintenance and to increase the chances of long-term success. Classes are taught by trained fitness professionals at the Human Performance Center of Boise State University.

The success rate of this program has been high. Participants report improvement in many areas commonly associated with depression: immediate help with their emotional state, prompt improvement in feelings of isolation and the ability to counteract lack of motivation. Although the program has not yet been offered to adolescents—most members in this first year are women in their twenties—it appears to be a good model for all age groups.

Exercise as a Preventative Measure

Several researchers report that participation in a regular exercise program may actually prevent future symptoms and disorders. "Exercise may help to prevent some forms of psychopathology by assisting people in managing some of the symptoms associated with psychopathology" (Plante, 1993, p. 373). Participation in exercise and sport enhances psychological well-being (Baumel, 1995; Norris et al., 1991; Oler et al., 1994; Plante, 1993; Plante & Rodin, 1990; Singer, 1992), thus playing a role as a preventative measure for deterring mental illness in adolescent girls.

Adolescent girls often have difficulties accepting the changes in their bodies; feelings of inferiority and insecurity haunt them (McGrath et al., 1990; Millstein, Petersen, & Nightingale, 1993; Nolen-Hoeksema, 1990). Exercise can provide a young girl with a positive image of her body—of its capabilities, its power and agility. Participating in a physical activity can provide feelings of competence and success (Holloway et al., 1988; Stein & Motta, 1992; Vealey, 1992). "Adolescents, whose problems are not particularly amenable to traditional forms of verbal psychotherapy, may also respond to an organized running program" (Buffone, 1984, p. 221). When adolescent girls have some passion and strong interest in participating in activities, it "can give them some perspective and sustain them through the toughest times" (Pipher, 1994, p. 266). For adolescents participating in a physical activity training program "exercise does operate as a buffering mechanism between stress and anxiety/depression" (Norris et al., 1991, p. 63).

There are feelings of powerlessness associated with adolescent depression and anxiety that can be counteracted by exercise and sport, where young girls and women can gain feelings of personal control (Stein & Motta, 1992). Positive mental health is enhanced by an involvement in a meaningful, goal-directed endeavor. Exercise, sport and physical activity can provide meaningful, goal-oriented experiences for adolescent girls in individual or group settings, or in community- and school-based environments.

CONCLUSIONS AND RECOMMENDATIONS

The consensus of the exercise science and behavioral medicine literature is that exercise and physical activity can promote psychological well-being. The information presented below represents some important conclusions and practical recommendations derived from this review of literature. This information can be particularly helpful for those individuals working with females in physical activity and sport settings.

- Involvement in physical activity, exercise and sport promotes psychological well-being. Additionally, the therapeutic use of exercise for improving the mental health of adolescent girls goes beyond traditional treatment and mental health programs. In effect, the use of physical activity as a mental health intervention would enhance the therapeutic opportunities for treating adolescent girls.
- Adolescent girls can achieve a healthy mental state through a variety of experiences related to exercise, sport and physical activity: the establishment of constructive relationships with peers, the influence of healthy role models, the tangible experiences of success and the lessons of how to deal with positive and negative physiological and psychological changes. Given the importance of such experiences, we should develop and implement mental health programs that foster females' participation in physical activity.
- Regular participation in exercise and physical activity can allay many of the symptoms of hopelessness and worthlessness, feelings typically associated with anxiety and depression. Involvement in physical activity not only counteracts these negative affective responses, but can instead create expectations of success. It is particularly important to facilitate regular participation in physical activity given that anxiety and depression are two mental health disorders prevalent among adolescent females (Nolen-Hoeksema, 1990).
- Exercise and sport can teach young girls problem-solving skills and promote feelings of self-worth. Additionally, exercise, physical activity and sport have been shown to be an antidepressive, a mood enhancer and an anxiety reducer, thereby acting as a natural, cost-effective intervention for the mental health of adolescent girls. The beneficial lessons learned through participation in physical activity can counteract the negative perceptions of self, the world and the future that often accompany feelings of anxiety and depression.

DIRECTIONS FOR FUTURE RESEARCH

The role and efficacy of exercise as a treatment intervention for all girls, and in particular adolescent girls, has not been adequately addressed in the literature. Filling this informational void will allow us to more fully develop exercise programs that can be used

as preventative and treatment interventions. Therefore, we must empirically document issues related to the mental health benefits of girls' participation in physical activity. Some research priorities are highlighted below.

- **Identify mediating factors associated with physical activity and mental health.** More empirical data need to be obtained to further our understanding regarding the mechanisms underlying the enhancement of girls' psychological well-being through physical activity. Additionally, we must conduct studies that determine the effects of socioeconomic status, race and/or ethnicity that singly or coactively influence the factors mediating the relationship between exercise and mental health.
- **Examine the relationship between mood state and exercise.** Investigations must examine the effect of exercise and sport participation on all levels of mood disorders experienced by girls. Conditions ranging from depressive symptoms to chronic/dysthymic disorders to major depression and their response to physical activity warrant examination.
- **Determine the efficacy of exercise as a therapeutic modality.** Research studies should examine the efficacy of exercise as a separate treatment intervention as compared with psychotherapy and pharmacotherapy for adolescent girls. Additionally, we must investigate the efficacy of exercise as an adjunct to both forms of traditional therapy. Relatedly, we must assess the cost-effectiveness of anti-depressant medication treatment, psychotherapy and exercise when used singularly as well as jointly.
- **Identify factors influencing exercise as a treatment intervention.** When using exercise as a treatment intervention to restore mental health for adolescent girls, studies must be designed to consider the impact of peer (same-sex and cross-sex) influences and individual versus group approaches when determining program effectiveness. Additionally, treatment programs employing physical activity as a therapeutic modality should be empirically tested in clinical settings to determine the efficacy and cost-effectiveness of the intervention.
- **Understand variables associated with exercise adoption and maintenance.** Investigations should identify and critically analyze various physical, psychological and sociological factors (both singularly and in combination) which influence exercise adoption and maintenance among adolescent girls.
- **Broaden the scope of our research to include factors related to diversity.** Traditionally, research has been confined to how certain psychological and physical characteristics of both the leader and the participant impact exercise involvement. Future studies should also investigate the influence of factors related to diversity such as gender, race and ethnicity.

- **Determine the perceptions of mental-health service providers in prescribing exercise as a form of treatment.** Studies must be conducted to identify and implement those factors that enhance partnerships between traditional mental health service providers and sport science scholars/practitioners. In order to achieve this interdisciplinary approach—and thus make exercise an integral part of treatment intervention—we need to understand the perceptions and attitudes of mental health service providers.

Policy Recommendations

GIRLS NEED SAFE, HEALTHY AND SUPPORTIVE ENVIRONMENTS to grow and excel. Policies need to tap the power and potential of physical activity and sport to advance girls' health, physical and emotional development, social well-being and educational aspirations and achievements. Efforts must be directed toward increasing girls' participation in physical activity and sport. It should also be noted that many of the following policy recommendations would, if implemented, enrich the experience of boys as well as girls.

In order to foster greater participation among girls in physical activity and sport:

- Consonant with the goals of "Healthy People 2000: National Health Promotion and Disease Prevention Objectives" (U.S. Department of Health and Human Services, 1991), school administrators and principals should require daily physical education.
- As student populations become more ethnically diverse, curriculum planners should develop innovative strategies to make physical activities closely suited to girls' interests, predilections and cultural backgrounds. An example of this is providing sports and physical activities such as soccer and dance which may be more likely to resonate with cultural familiarity for girls from African, Latin or Caribbean origins.
- Federal and state lawmakers should explore ways to provide school districts and municipalities with relief from high liability insurance costs that may limit their ability to provide fitness and athletic opportunities for children and adolescents. Such relief would also allow for greater use of existing facilities by the wider public.
- Enforcement of Title IX should be vigorously pursued by government and administrative officials at the federal, state and local levels.
- Develop after-school and community-based programs that provide safe environments for girls to engage in a variety of exercise and athletic activities.
- Organizations with public mandates to foster a better quality of life through sport and athletic involvement (e.g., USOC, NCAA) should focus not only on elite athletes, but on grassroots/community-based programs as well. It is particularly important that some of these programs be designed to appeal to girls. Given what we know about the powerful effects of role modeling, we should also promote the inclusion of females in leadership positions at all levels of organizational structure.

thus sending the message that women are leaders too.

In order to better utilize physical activity and sport as vehicles for promoting girls' physical and mental health:

- Expand health education efforts in schools and community health programs that educate youth and the general public concerning the impact of physical activity and sport in the lives of girls.
- Physical educators and community health care providers should develop multidisciplinary programs that include a combination of exercise, diet and nutritional information to help lower risks for obesity, high cholesterol and osteoporosis.
- Identify programs that effectively use physical activity and sport as vehicles for lowering girls' risk for unwanted sexual behavior and pregnancy.
- Encourage print and broadcast journalists to project appropriate role models for girls. For example, mass media should avoid using images that create unrealistic expectations related to body image such as an excessively thin body composition.
- Longitudinal, retrospective and case research studies should be funded so that we can determine the extent to which promotion of daily physical activity for girls reduces later risk for adult diseases such as coronary heart disease, diabetes and certain cancers.
- Health care providers should explore innovative ways to promote physical activity among girls through counseling, anticipatory guidance and education.
- In keeping with the "interdisciplinary team" treatment approach now highly valued in most mental health settings, steps should be taken to initiate and increase partnerships between sport science researchers and practitioners (e.g., sport psychology scholars working with sport psychology consultants and kinesiotherapists) when addressing the research and educational challenges identified in this report.

In order to enhance the contributions of physical activity and sport to girls' educational achievements and social development:

- Coaching certification programs should include information about the real and potential benefits of physical activity and sport for girls' health and development, as well as prevention of eating disorders, injury and sexual harassment.
- Continue to revise the content and process of physical education classes in order to more closely meet girls' preferences and concerns. Involve girls in the selection of these activities.

- Foundations and government agencies should fund research that examines how athletic participation can be more fully used as a tool to enhance girls' academic performance and lower their risk for school dropout.
- Research should be encouraged to investigate the various ways in which diversity—race, ethnicity and disability—impacts girls' involvement in sport and physical activity. Particular attention should be given to those research efforts utilizing comparative samples across different groups (e.g., socio-economic status, sexual orientation).

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